1 The box-and-whisker plot below represents the results of tests scores in a math class.

What do the scores 65, 85, and 100 represent?
1) $Q_1$, median, $Q_3$
2) $Q_1$, $Q_3$, maximum
3) median, $Q_1$, maximum
4) minimum, median, maximum

2 A designer created a garden, as shown in the diagram below. The garden consists of four quarter-circles of equal size inside a square. The designer put a fence around both the inside and the outside of the garden.

Which expression represents the amount of fencing, in yards, that the designer used for the fence?
1) $40 + 10\pi$
2) $40 + 25\pi$
3) $100 + 10\pi$
4) $100 + 25\pi$

3 Which event is certain to happen?
1) Everyone walking into a room will have red hair.
2) All babies born in June will be males.
3) The Yankees baseball team will win the World Series.
4) The Sun will rise in the east.

4 The bull's-eye of a dartboard has a radius of 2 inches and the entire board has a radius of 9 inches, as shown in the diagram below.

If a dart is thrown and hits the board, what is the probability that the dart will land in the bull's-eye?
1) $\frac{2}{9}$
2) $\frac{7}{9}$
3) $\frac{4}{81}$
4) $\frac{49}{81}$
5 Which statement illustrates the additive identity property?
1) \(6 + 0 = 6\)
2) \(-6 + 6 = 0\)
3) \(4(6 + 3) = 4(6) + 4(3)\)
4) \((4 + 6) + 3 = 4 + (6 + 3)\)

6 Two equations were graphed on the set of axes below.

Which point is a solution of the system of equations shown on the graph?
1) \((8, 9)\)
2) \((5, 0)\)
3) \((0, 3)\)
4) \((2, -3)\)

7 Which is the equation of a parabola that has the same vertex as the parabola represented by \(y = x^2\), but is wider?
1) \(y = x^2 + 2\)
2) \(y = x^2 - 2\)
3) \(y = 2x^2\)
4) \(y = \frac{1}{2}x^2\)

8 The statement \([-15] < x < [-20]\) is true when \(x\) is equal to
1) \(-16\)
2) \(-14\)
3) \(17\)
4) \(21\)

9 Which equation represents the line that passes through the point \((3, 4)\) and is parallel to the \(x\)-axis?
1) \(x = 4\)
2) \(x = -3\)
3) \(y = 4\)
4) \(y = -3\)

10 A car depreciates (loses value) at a rate of 4.5% annually. Greg purchased a car for \$12,500. Which equation can be used to determine the value of the car, \(V\), after 5 years?
1) \(V = 12,500(0.55)^5\)
2) \(V = 12,500(0.955)^5\)
3) \(V = 12,500(1.045)^5\)
4) \(V = 12,500(1.45)^5\)

11 The inequality \(-2 \leq x \leq 3\) can be written as
1) \((-2, 3)\)
2) \([-2, 3)\)
3) \((-2, 3]\)
4) \([-2, 3]\)
12 What is $24x^2y^6 - 16x^2y^2 + 4xy^2$ divided by $4xy^2$?
   1) $6xy^4 - 4x^5$
   2) $6xy^4 - 4x^5 + 1$
   3) $6x^2y^3 - 4x^5y$
   4) $6x^2y^3 - 4x^5y + 1$

13 The expression $\frac{2x^2 + 10x - 28}{4x + 28}$ is equivalent to
   1) $\frac{x - 2}{2}$
   2) $x - 1$
   3) $\frac{x + 2}{2}$
   4) $\frac{x + 5}{2}$

14 Which equation represents a line that is parallel to the line whose equation is $2x - 3y = 9$?
   1) $y = \frac{2}{3}x - 4$
   2) $y = -\frac{2}{3}x + 4$
   3) $y = \frac{3}{2}x - 4$
   4) $y = -\frac{3}{2}x + 4$

15 The current population of a town is 10,000. If the population, $P$, increases by 20% each year, which equation could be used to find the population after $t$ years?
   1) $P = 10,000(0.2)^t$
   2) $P = 10,000(0.8)^t$
   3) $P = 10,000(1.2)^t$
   4) $P = 10,000(1.8)^t$

16 Brianna's score on a national math assessment exceeded the scores of 95,000 of the 125,000 students who took the assessment. What was her percentile rank?
   1) 6
   2) 24
   3) 31
   4) 76

17 Which point lies on the graph represented by the equation $3y + 2x = 8$?
   1) $(-2, 7)$
   2) $(0, 4)$
   3) $(2, 4)$
   4) $(7, -2)$

18 The probability it will rain tomorrow is $\frac{1}{2}$. The probability that our team will win tomorrow’s basketball game is $\frac{3}{5}$. Which expression represents the probability that it will rain and that our team will not win the game?
   1) $\frac{1}{2} + \frac{3}{5}$
   2) $\frac{1}{2} + \frac{2}{5}$
   3) $\frac{1}{2} \times \frac{3}{5}$
   4) $\frac{1}{2} \times \frac{2}{5}$

19 Which equation is an example of the use of the associative property of addition?
   1) $x + 7 = 7 + x$
   2) $3(x + y) = 3x + 3y$
   3) $(x + y) + 3 = x + (y + 3)$
   4) $3 + (x + y) = (x + y) + 3$
20 Marcy determined that her father's age is four less than three times her age. If \( x \) represents Marcy's age, which expression represents her father's age?

1) \( 3x - 4 \)
2) \( 3(x - 4) \)
3) \( 4x - 3 \)
4) \( 4 - 3x \)

21 The number of hours spent on math homework during one week and the math exam grades for eleven students in Ms. Smith's algebra class are plotted below.

Based on the plotted data, what is the correlation between the time spent on homework and the exam grade?

1) positive
2) negative
3) no correlation
4) cannot be determined

22 If the point \((5, k)\) lies on the line represented by the equation \(2x + y = 9\), the value of \(k\) is

1) 1
2) 2
3) -1
4) -2

23 The line represented by the equation \(2y - 3x = 4\) has a slope of

1) \(-\frac{3}{2}\)
2) 2
3) 3
4) \(\frac{3}{2}\)

24 Which equation is represented by the graph below?

1) \(2y + x = 10\)
2) \(y - 2x = -5\)
3) \(-2y = 10x - 4\)
4) \(2y = -4x - 10\)
25 A system of equations is graphed on the set of axes below.

The solution of this system is
1) (0,4)
2) (2,4)
3) (4,2)
4) (8,0)

26 Factored completely, the expression
\[3x^3 - 33x^2 + 90x\] is equivalent to
1) \([x(x - 3)][x + 30]\)
2) \([x(x - 11)][x + 30]\)
3) \([x(x + 5)][x + 6]\)
4) \([x(x - 5)][x - 6]\)

27 The roots of the equation \[3x^2 - 27x = 0\] are
1) 0 and 9
2) 0 and -9
3) 0 and 3
4) 0 and -3

28 Which graph does not represent the graph of a function?

29 Monique has three sons who play football, two sons who play baseball, and one son who plays both sports. If all of her sons play baseball or football, how many sons does she have?
1) 5
2) 6
3) 3
4) 4
30 In the diagram below, circle O is inscribed in square ABCD. The square has an area of 36.

![Diagram of a circle inscribed in a square]

What is the area of the circle?
1) 9?
2) 6?
3) 3?
4) 36?

31 In triangle RST, angle R is a right angle. If TR = 6 and TS = 8, what is the length of RS?
1) 10
2) 2
3) 2√7
4) 7√2

32 Byron is 3 years older than Doug. The product of their ages is 40. How old is Doug?
1) 10
2) 8
3) 5
4) 4

33 In right triangle ABC, m∠C = 90, AC = 7, and AB = 13. What is the length of BC?
1) 6
2) 20
3) √120
4) √218

34 The box-and-whisker plot below represents the ages of 12 people.

![Box-and-whisker plot]

What percentage of these people are age 15 or older?
1) 25
2) 35
3) 75
4) 85

35 A value of x that makes the expression \( \frac{x^2 + 4x - 12}{x^2 - 2x - 15} \) undefined is
1) -6
2) -2
3) 3
4) 5
36 Mr. Stanton asked his students to write an algebraic expression on a piece of paper. He chose four students to go to the board and write their expression.
   Robert wrote: $4(2x + 5) \geq 17$
   Meredith wrote: $3y - 7 + 11z$
   Steven wrote: $9w + 2 = 20$
   Cynthia wrote: $8 + 10 - 4 = 14$
Which student wrote an algebraic expression?
1) Robert
2) Meredith
3) Steven
4) Cynthia

37 If $x = -3$, what is the value of $|x - 4| - x^2$?
1) $-8$
2) $-2$
3) $7$
4) $16$

38 If $2y + 2w = x$, then $w$, in terms of $x$ and $y$, is equal to
1) $x - y$
2) $\frac{x - 2y}{2}$
3) $x + y$
4) $\frac{x + 2y}{2}$

39 The value of the expression $6! + \frac{5!(3!)}{4!} - 10$ is
1) $50$
2) $102$
3) $740$
4) $750$

40 In the figure below, $ABCD$ is a square and semicircle $O$ has a radius of 6.

What is the area of the figure?
1) $36 + 6\pi$
2) $36 + 18\pi$
3) $144 + 18\pi$
4) $144 + 36\pi$

41 The diagram below shows the graph of which inequality?

1) $y > x - 1$
2) $y \geq x - 1$
3) $y < x - 1$
4) $y \leq x - 1$
42. If the volume of a cube is 8 cubic centimeters, what is its surface area, in square centimeters?
   1) 32
   2) 24
   3) 12
   4) 4

43. For which values of $x$ is the fraction $\frac{x^2 + x - 6}{x^2 + 5x - 6}$ undefined?
   1) 1 and -6
   2) 2 and -3
   3) 3 and -2
   4) 6 and -1

44. The roots of a quadratic equation can be found using the graph below.

   ![Graph of a quadratic equation]

   What are the roots of this equation?
   1) -4, only
   2) -4 and -1
   3) -1 and 4
   4) -4, -1, and 4

45. Which expression is equivalent to $\frac{2x^6 - 18x^4 + 2x^2}{2x^2}$?
   1) $x^3 - 9x^2$
   2) $x^4 - 9x^2$
   3) $x^3 - 9x^2 + 1$
   4) $x^4 - 9x^2 + 1$

46. Which table shows bivariate data?

   1)

<table>
<thead>
<tr>
<th>Age (yr)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>15</td>
<td>21</td>
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<tr>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>18</td>
<td>15</td>
</tr>
</tbody>
</table>

   2)

<table>
<thead>
<tr>
<th>Type of Car</th>
<th>Average Gas Mileage (mpg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>van</td>
<td>25</td>
</tr>
<tr>
<td>SUV</td>
<td>23</td>
</tr>
<tr>
<td>luxury</td>
<td>26</td>
</tr>
<tr>
<td>compact</td>
<td>28</td>
</tr>
<tr>
<td>pickup</td>
<td>22</td>
</tr>
</tbody>
</table>

   3)

<table>
<thead>
<tr>
<th>Time Spent Studying (hr)</th>
<th>Test Grade (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>65</td>
</tr>
<tr>
<td>2</td>
<td>72</td>
</tr>
<tr>
<td>3</td>
<td>83</td>
</tr>
<tr>
<td>4</td>
<td>85</td>
</tr>
<tr>
<td>5</td>
<td>92</td>
</tr>
</tbody>
</table>

   4)
47 The length of one side of a square is 13 feet. What is the length, to the nearest foot, of a diagonal of the square?
1) 13
2) 18
3) 19
4) 26

48 Which verbal expression is represented by 2(x + 4)?
1) twice the sum of a number and four
2) the sum of two times a number and four
3) two times the difference of a number and four
4) twice the product of a number and four

49 Which set builder notation describes \{-2, -1, 0, 1, 2, 3\}?
1) \(\{x| -3 \leq x \leq 3, \text{ where } x \text{ is an integer}\}\)
2) \(\{x| -3 < x \leq 4, \text{ where } x \text{ is an integer}\}\)
3) \(\{x| -2 < x < 3, \text{ where } x \text{ is an integer}\}\)
4) \(\{x| -2 \leq x < 4, \text{ where } x \text{ is an integer}\}\)

50 The graph of a parabola is represented by the equation \(y = ax^2\) where \(a\) is a positive integer. If \(a\) is multiplied by 2, the new parabola will become
1) narrower and open downward
2) narrower and open upward
3) wider and open downward
4) wider and open upward

52 Which situation is an example of bivariate data?
1) the number of pizzas Tanya eats during her years in high school
2) the number of times Ezra puts air in his bicycle tires during the summer
3) the number of home runs Elias hits per game and the number of hours he practices baseball
4) the number of hours Nellie studies for her mathematics tests during the first half of the school year

53 Which situation describes a negative correlation?
1) the amount of gas left in a car's tank and the amount of gas used from it
2) the number of gallons of gas purchased and the amount paid for the gas
3) the size of a car's gas tank and the number of gallons it holds
4) the number of miles driven and the amount of gas used

54 What is the sum of \(\frac{2y}{y+5}\) and \(\frac{10}{y+5}\) expressed in simplest form?
1) 1
2) 2
3) \(\frac{12y}{y+5}\)
4) \(\frac{2y+10}{y+5}\)

55 What is the solution set of the system of equations \(x + y = 5\) and \(y = x^2 - 25\)?
1) \{(0, 5), (11, -6)\}
2) \{(5, 0), (-6, 11)\}
3) \{(-5, 0), (6, 11)\}
4) \{(-5, 10), (6, -1)\}
56 If \( rx - st = r \), which expression represents \( x \)?

1) \( \frac{r + st}{r} \)
2) \( \frac{r}{r + st} \)
3) \( \frac{r - st}{r} \)
4) \( \frac{r}{r - st} \)

57 Given:

\( A = \{ \text{all odd integers from 1 through 19, inclusive} \} \)
\( B = \{9, 11, 13, 15, 17\} \)

What is the complement of set \( B \) within set \( A \)?

1) \( \{3, 5, 7\} \)
2) \( \{3, 5, 7, 19\} \)
3) \( \{1, 3, 5, 7\} \)
4) \( \{1, 3, 5, 7, 19\} \)

58 What is the slope of the line that passes through the points \((2, -3)\) and \((5, 1)\)?

1) \( \frac{-2}{3} \)
2) \( \frac{2}{3} \)
3) \( \frac{-4}{3} \)
4) \( \frac{4}{3} \)

59 The expression \( 100n^2 - 1 \) is equivalent to

1) \( (10n + 1)(10n - 1) \)
2) \( (10n - 1)(10n - 1) \)
3) \( (50n + 1)(50n - 1) \)
4) \( (50n - 1)(50n - 1) \)

60 Noj is 5 years older than Jacob. The product of their ages is 84. How old is Noj?

1) 6
2) 7
3) 12
4) 14

61 A set of data is graphed on the scatter plot below.

This scatter plot shows

1) no correlation
2) positive correlation
3) negative correlation
4) undefined correlation
62 Campsite A and campsite B are located directly opposite each other on the shores of Lake Omega, as shown in the diagram below. The two campsites form a right triangle with Sam’s position, S. The distance from campsite B to Sam’s position is 1,300 yards, and campsite A is 1,700 yards from his position.

What is the distance from campsite A to campsite B, to the nearest yard?
1) 1,095
2) 1,096
3) 2,140
4) 2,141

63 Elizabeth is baking chocolate chip cookies. A single batch uses \( \frac{3}{4} \) teaspoon of vanilla. If Elizabeth is mixing the ingredients for five batches at the same time, how many tablespoons of vanilla will she use?

\[
3 \text{ teaspoons} = 1 \text{ tablespoon}
\]

1) \( 1 \frac{1}{4} \)
2) \( 1 \frac{3}{4} \)
3) \( 3 \frac{3}{4} \)
4) \( 5 \frac{3}{4} \)

64 Which graph represents a function?

1)  
2)  
3)  
4)  

65 What is one-third of \( 3^6 \)?
1) \( 1^2 \)
2) \( 3^2 \)
3) \( 3^5 \)
4) \( 9^6 \)
66 The graph of \( y = |x + 2| \) is shown below.

Which graph represents \( y = -|x + 2| \)?

67 What is \( 2\sqrt{45} \) expressed in simplest radical form?

1) \( 3\sqrt{5} \)
2) \( 5\sqrt{5} \)
3) \( 6\sqrt{5} \)
4) \( 18\sqrt{5} \)

68 The cumulative frequency table below shows the length of time that 30 students spent text messaging on a weekend.

<table>
<thead>
<tr>
<th>Minutes Used</th>
<th>Cumulative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>31–40</td>
<td>2</td>
</tr>
<tr>
<td>31–50</td>
<td>5</td>
</tr>
<tr>
<td>31–60</td>
<td>10</td>
</tr>
<tr>
<td>31–70</td>
<td>19</td>
</tr>
<tr>
<td>31–80</td>
<td>30</td>
</tr>
</tbody>
</table>

Which 10-minute interval contains the first quartile?

1) 31 – 40
2) 41 – 50
3) 51 – 60
4) 61 – 70

69 In a baseball game, the ball traveled 350.7 feet in 4.2 seconds. What was the average speed of the ball, in feet per second?

1) 83.5
2) 177.5
3) 354.9
4) 1,472.9
70. What is the solution of the equation \( \frac{x + 2}{2} = \frac{4}{x} \)?

1) 1 and -8
2) 2 and -4
3) -1 and 8
4) -2 and 4

71. The formula for the volume of a pyramid is \( V = \frac{1}{3} Bh \). What is \( h \) expressed in terms of \( B \) and \( V \)?

1) \( h = \frac{1}{3} VB \)
2) \( h = \frac{V}{3B} \)
3) \( h = \frac{3V}{B} \)
4) \( h = 3VB \)

72. Which value of \( x \) is the solution of the equation \( \frac{1}{7} + \frac{2x}{3} = \frac{15x - 3}{21} \)?

1) 6
2) 0
3) \( \frac{4}{13} \)
4) \( \frac{6}{29} \)

73. If \( n \) is an odd integer, which equation can be used to find three consecutive odd integers whose sum is -3?

1) \( n + (n + 1) + (n + 3) = -3 \)
2) \( n + (n + 1) + (n + 2) = -3 \)
3) \( n + (n + 2) + (n + 4) = -3 \)
4) \( n + (n + 2) + (n + 3) = -3 \)

74. The rectangular prism shown below has a length of 3.0 cm, a width of 2.2 cm, and a height of 7.5 cm.

What is the surface area, in square centimeters?

1) 45.6
2) 49.5
3) 78.0
4) 91.2

75. Using the substitution method, Ken solves the following system of equations algebraically.

\[
\begin{align*}
2x - y &= 5 \\
3x + 2y &= -3
\end{align*}
\]

Which equivalent equation could Ken use?

1) \( 3x + 2(2x - 5) = -3 \)
2) \( 3x + 2(3 - 2x) = -3 \)
3) \( 3\left( \frac{y + \frac{5}{2}}{2} \right) + 2y = -3 \)
4) \( 3\left( \frac{5}{2} - y \right) + 2y = -3 \)
76 What is the value of \[ \left| \frac{4(-6) + 18}{4!} \right| \]?
1) \( \frac{1}{4} \)
2) \( -\frac{1}{4} \)
3) 12
4) -12

77 What is the slope of the line represented by the equation \( 4x + 3y = 12 \)?
1) \( \frac{4}{3} \)
2) \( \frac{3}{4} \)
3) \( -\frac{3}{4} \)
4) \( -\frac{4}{3} \)

78 Written in set-builder notation, \( S = \{1, 3, 5, 7, 9\} \) is
1) \( \{x|1 < x < 9, \text{ where } x \text{ is a prime number}\} \)
2) \( \{x|1 \leq x \leq 9, \text{ where } x \text{ is a prime number}\} \)
3) \( \{x|1 < x < 9, \text{ where } x \text{ is an odd integer}\} \)
4) \( \{x|1 \leq x \leq 9, \text{ where } x \text{ is an odd integer}\} \)

79 A school newspaper will survey students about the quality of the school’s lunch program. Which method will create the least biased results?
1) Twenty-five vegetarians are randomly surveyed.
2) Twenty-five students are randomly chosen from each grade level.
3) Students who dislike the school’s lunch program are chosen to complete the survey.
4) A booth is set up in the cafeteria for the students to voluntarily complete the survey.

80 What is the sum of \(-3x^2 - 7x + 9\) and \(-5x^2 + 6x - 4\)?
1) \(-8x^2 - x + 5\)
2) \(-8x^4 - x + 5\)
3) \(-8x^2 - 13x + 13\)
4) \(-8x^4 - 13x^2 + 13\)

81 Which graph represents the inequality \( y \geq x + 3 \)?
82 The equation $3(4x) = (4x)3$ illustrates which property?
1) commutative
2) associative
3) distributive
4) multiplicative inverse

83 How is the graph of $y = x^2 + 4x + 3$ affected when the coefficient of $x^2$ is changed to a smaller positive number?
1) The graph becomes wider, and the $y$-intercept changes.
2) The graph becomes wider, and the $y$-intercept stays the same.
3) The graph becomes narrower, and the $y$-intercept changes.
4) The graph becomes narrower, and the $y$-intercept stays the same.

84 The expression $9a^2 - 64b^2$ is equivalent to
1) $(9a - 8b)(a + 8b)$
2) $(9a - 8b)(a - 8b)$
3) $(3a - 8b)(3a + 8b)$
4) $(3a - 8b)(3a - 8b)$

85 Craig sees an advertisement for a car in a newspaper. Which information would not be classified as quantitative?
1) the cost of the car
2) the car’s mileage
3) the model of the car
4) the weight of the car

86 The total score in a football game was 72 points. The winning team scored 12 points more than the losing team. How many points did the winning team score?
1) 30
2) 42
3) 54
4) 60

87 A car uses one gallon of gasoline for every 20 miles it travels. If a gallon of gasoline costs $3.98, how much will the gas cost, to the nearest dollar, to travel 180 miles?
1) 9
2) 36
3) 45
4) 80

88 If the expression $(2y^a)^4$ is equivalent to $16y^8$, what is the value of $a$?
1) 12
2) 2
3) 32
4) 4

89 Which coordinates represent a point in the solution set of the system of inequalities shown below?

\[
\begin{align*}
y &\leq \frac{1}{2}x + 13 \\
4x + 2y &> 3
\end{align*}
\]
1) $(-4,1)$
2) $(-2,2)$
3) $(1,-4)$
4) $(2,-2)$
90 A survey is being conducted to determine if a cable company should add another sports channel to their schedule. Which random survey would be the least biased?
1) surveying 30 men at a gym
2) surveying 45 people at a mall
3) surveying 50 fans at a football game
4) surveying 20 members of a high school soccer team

91 A cube with faces numbered 1 through 6 is rolled 75 times, and the results are given in the table below.

<table>
<thead>
<tr>
<th>Number</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

Based on these results, which statement is true?
1) \(P(\text{odd}) < P(\text{even})\)
2) \(P(3 \text{ or less}) < P(\text{odd})\)
3) \(P(\text{even}) < P(2 \text{ or 4})\)
4) \(P(2 \text{ or 4}) < P(3 \text{ or less})\)

92 What is the solution of \(\frac{2}{x + 1} = \frac{x + 1}{2}\)?
1) \(-1 \text{ and } -3\)
2) \(-1 \text{ and } 3\)
3) \(1 \text{ and } -3\)
4) \(1 \text{ and } 3\)

93 The value of \(y\) in the equation \(0.06y + 200 = 0.03y + 350\) is
1) 500
2) 1,666.6
3) 5,000
4) 18,333.3

94 Which expression represents “5 less than twice \(x\)”?
1) \(2x - 5\)
2) \(5 - 2x\)
3) \(2(5 - x)\)
4) \(2(x - 5)\)

95 When \(2x^2 - 3x + 2\) is subtracted from \(4x^2 - 5x + 2\), the result is
1) \(2x^2 - 2x\)
2) \(-2x^2 + 2x\)
3) \(-2x^2 - 8x + 4\)
4) \(2x^2 - 8x + 4\)

96 Marie currently has a collection of 58 stamps. If she buys \(s\) stamps each week for \(w\) weeks, which expression represents the total number of stamps she will have?
1) \(58sw\)
2) \(58 + sw\)
3) \(58s + w\)
4) \(58 + s + w\)
97 Which graph does not represent a function?

1) 

2) 

3) 

4) 

98 Which expression represents the number of hours in \( w \) weeks and \( d \) days?

1) \( 7w + 12d \)
2) \( 84w + 24d \)
3) \( 168w + 24d \)
4) \( 168w + 60d \)

99 Which equation is true?

1) \( \frac{c^5}{d^7} \cdot \frac{d^5}{c} = \frac{c^4}{d^4} \)
2) \( (-2m^2p)^3 = -8m^6p^3 \)
3) \( \left( \frac{s^3p}{s^4t^5} \right)^2 = \frac{t^5}{s^2} \)
4) \( (-2a^2b^3)(3ab^2) = a^3b^5 \)

100 The product of \( \frac{4x^2}{7y^2} \) and \( \frac{21y^3}{20x^4} \), expressed in simplest form, is

1) \( 0.6x^2y \)
2) \( \frac{3y}{5x^2} \)
3) \( \frac{12x^2y^3}{20x^4y^2} \)
4) \( \frac{84x^2y^3}{140x^3y^2} \)
101 Given:  
\[ A = \{1, 3, 5, 7, 9\} \]
\[ B = \{2, 4, 6, 8, 10\} \]
\[ C = \{2, 3, 5, 7\} \]
\[ D = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} \]
What statement is false?  
1) \( A \cup B \cup C = D \)
2) \( A \cap B \cap C = \{\} \)
3) \( A \cup C = \{1, 2, 3, 5, 7\} \)
4) \( A \cap C = \{3, 5, 7\} \)

102 What is the product of \((3x + 2)\) and \((x - 7)\)?  
1) \(3x^2 - 14\)
2) \(3x^2 - 5x - 14\)
3) \(3x^2 - 19x - 14\)
4) \(3x^2 - 23x - 14\)

103 How many solutions are there for the following system of equations? 
\[ y = x^2 - 5x + 3 \]
\[ y = x - 6 \]
1) 1  
2) 2  
3) 3  
4) 0

104 The expression \(\frac{(4x^3)^2}{2x}\) is equivalent to  
1) \(4x^4\)
2) \(4x^5\)
3) \(8x^4\)
4) \(8x^5\)

105 The scatter plot below shows the profit, by month, for a new company for the first year of operation. Kate drew a line of best fit, as shown in the diagram.  
Using this line, what is the best estimate for profit in the 18th month?  
1) \$35,000\)
2) \$37,750\)
3) \$42,500\)
4) \$45,000\)

106 Which set of data can be classified as quantitative?  
1) first names of students in a chess club  
2) ages of students in a government class  
3) hair colors of students in a debate club  
4) favorite sports of students in a gym class

107 In \(\triangle ABC\), \(m\angle C = 90\). If \(AB = 5\) and \(AC = 4\), which statement is not true?  
1) \(\cos A = \frac{4}{5}\)
2) \(\tan A = \frac{3}{4}\)
3) \(\sin B = \frac{4}{5}\)
4) \(\tan B = \frac{5}{3}\)
108. Which value of $x$ is in the solution set of $-3x + 8 \geq 14$?
   1) $-3$
   2) $-1$
   3) $0$
   4) $3$

109. Jason’s part-time job pays him $155$ a week. If he has already saved $375$, what is the minimum number of weeks he needs to work in order to have enough money to buy a dirt bike for $900$?
   1) $8$
   2) $9$
   3) $3$
   4) $4$

110. Which ordered pair is in the solution set of the system of inequalities $y \leq 3x + 1$ and $x - y > 1$?
   1) $(-1, -2)$
   2) $(2, -1)$
   3) $(1, 2)$
   4) $(-1, 2)$

111. Which equation represents a line that is parallel to the $y$-axis and passes through the point $(4, 3)$?
   1) $x = 3$
   2) $x = 4$
   3) $y = 3$
   4) $y = 4$

112. Which equation represents a line that has a slope of $\frac{3}{4}$ and passes through the point $(2, 1)$?
   1) $3y = 4x - 5$
   2) $3y = 4x + 2$
   3) $4y = 3x - 2$
   4) $4y = 3x + 5$

113. In right triangle $ABC$ shown below, what is the value of $\cos A$?

![Diagram of right triangle ABC]

114. Which equation represents a line that is parallel to the line whose equation is $y = -3x - 7$?
   1) $y = -3x + 4$
   2) $y = -\frac{1}{3}x - 7$
   3) $y = \frac{1}{3}x + 5$
   4) $y = 3x - 2$
115. The actual dimensions of a rectangle are 2.6 cm by 6.9 cm. Andy measures the sides as 2.5 cm by 6.8 cm. In calculating the area, what is the relative error, to the nearest thousandth?

1) 0.055  
2) 0.052  
3) 0.022  
4) 0.021

116. Gabriella has 20 quarters, 15 dimes, 7 nickels, and 8 pennies in a jar. After taking 6 quarters out of the jar, what will be the probability of Gabriella randomly selecting a quarter from the coins left in the jar?

1) \( \frac{14}{44} \)  
2) \( \frac{30}{44} \)  
3) \( \frac{14}{50} \)  
4) \( \frac{20}{50} \)

117. The expression \( \frac{x-3}{x+2} \) is undefined when the value of \( x \) is

1) \(-2\), only  
2) \(-2\) and 3  
3) 3, only  
4) \(-3\) and 2

118. Is the equation \( A = 21000(1 - 0.12)^t \) a model of exponential growth or exponential decay, and what is the rate (percent) of change per time period?

1) exponential growth and 12%  
2) exponential growth and 88%  
3) exponential decay and 12%  
4) exponential decay and 88%

119. The box-and-whisker plot below represents a set of grades in a college statistics class.

Which interval contains exactly 50% of the grades?

1) 63-88  
2) 63-95  
3) 75-81  
4) 75-88

120. What are the coordinates of the vertex and the equation of the axis of symmetry of the parabola shown in the graph below?

1) (0,2) and \( y = 2 \)  
2) (0,2) and \( x = 2 \)  
3) \((-2,6)\) and \( y = -2 \)  
4) \((-2,6)\) and \( x = -2 \)
121 The roots of the equation \( x^2 - 14x + 48 = 0 \) are
1) \(-6\) and \(-8\)
2) \(-6\) and \(8\)
3) \(6\) and \(-8\)
4) \(6\) and \(8\)

122 A correct translation of “six less than twice the value of \(x\)” is
1) \(2x < 6\)
2) \(2x - 6\)
3) \(6 < 2x\)
4) \(6 - 2x\)

123 Which expression is equivalent to \(64 - x^2\)?
1) \((8 - x)(8 - x)\)
2) \((8 - x)(8 + x)\)
3) \((x - 8)(x - 8)\)
4) \((x - 8)(x + 8)\)

124 An art studio has a list of information posted with each sculpture that is for sale. Each entry in the list could be classified as quantitative except for the
1) cost
2) height
3) artist
4) weight

125 The expression \(\frac{6 \times 10^{-7}}{3 \times 10^{-3}}\) is equivalent to
1) \(2 \times 10^4\)
2) \(2 \times 10^{10}\)
3) \(2 \times 10^{-4}\)
4) \(2 \times 10^{-10}\)

126 When \(8x^2 + 3x + 2\) is subtracted from \(9x^2 - 3x - 4\), the result is
1) \(x^2 - 2\)
2) \(17x^2 - 2\)
3) \(-x^2 + 6x + 6\)
4) \(x^2 - 6x - 6\)

127 Which statement is true about the data set 4, 5, 6, 6, 7, 9, 12?
1) mean = mode
2) mode = median
3) mean < median
4) mode > mean

128 A cell phone can receive 120 messages per minute. At this rate, how many messages can the phone receive in 150 seconds?
1) 48
2) 75
3) 300
4) 18,000

129 Given: \(A = \{2, 4, 5, 7, 8\}\)
\[ B = \{3, 5, 8, 9\} \]
What is \(A \cup B\)?
1) \{5\}
2) \{5, 8\}
3) \{2, 3, 4, 7, 9\}
4) \{2, 3, 4, 5, 7, 8, 9\}
130 Which graph represents a function?

1) 

2) 

3) 

4) 

131 Given: \( R = \{1, 2, 3, 4\} \)
\( A = \{0, 2, 4, 6\} \)
\( P = \{1, 3, 5, 7\} \)

What is \( R \cap P \)?
1) \( \{0, 1, 2, 3, 4, 5, 6, 7\} \)
2) \( \{1, 2, 3, 4, 5, 7\} \)
3) \( \{1, 3\} \)
4) \( \{2, 4\} \)

132 Which equation could be used to find the measure of angle \( D \) in the right triangle shown in the diagram below?

![Right Triangle Diagram]

1) \( \cos D = \frac{12}{13} \)
2) \( \cos D = \frac{13}{12} \)
3) \( \sin D = \frac{5}{13} \)
4) \( \sin D = \frac{12}{13} \)

133 Which interval notation represents \(-3 \leq x \leq 3\)?
1) \( [-3, 3] \)
2) \( (-3, 3] \)
3) \( [-3, 3) \)
4) \( (-3, 3) \)
134 If \( A = \{0, 1, 3, 4, 6, 7\}, B = \{0, 2, 3, 5, 6, \} \), and \( C = \{0, 1, 4, 6, 7\} \), then \( A \cap B \cap C \) is
1) \( \{0, 1, 2, 3, 4, 5, 6, 7\} \)
2) \( \{0, 3, 6\} \)
3) \( \{0, 6\} \)
4) \( \{0\} \)

135 If \( k = am + 3mx \), the value of \( m \) in terms of \( a, k, \) and \( x \) can be expressed as
1) \( \frac{k}{a + 3x} \)
2) \( \frac{k - 3mx}{a} \)
3) \( \frac{k - am}{3x} \)
4) \( \frac{k - a}{3x} \)

136 The solutions of \( x^2 = 16x - 28 \) are
1) \(-2 \) and \(-14 \)
2) \(2 \) and \(14 \)
3) \(-4 \) and \(-7 \)
4) \(4 \) and \(7 \)

137 What is the slope of the line that passes through the points \((4, -7)\) and \((9, 1)\)?
1) \(\frac{5}{8}\)
2) \(\frac{8}{5}\)
3) \(-\frac{6}{12}\)
4) \(-\frac{13}{6}\)

138 What is the vertex of the parabola represented by the equation \( y = -2x^2 + 24x - 100 \)?
1) \(x = -6\)
2) \(x = 6\)
3) \((6, -28)\)
4) \((-6, -316)\)

139 Mr. Smith invested $2,500 in a savings account that earns 3% interest compounded annually. He made no additional deposits or withdrawals. Which expression can be used to determine the number of dollars in this account at the end of 4 years?
1) \(2500(1 + 0.03)^4\)
2) \(2500(1 + 0.3)^4\)
3) \(2500(1 + 0.04)^3\)
4) \(2500(1 + 0.4)^3\)

140 The sum of \(3x^2 + 5x - 6\) and \(-x^2 + 3x + 9\) is
1) \(2x^2 + 8x - 15\)
2) \(2x^2 + 8x + 3\)
3) \(2x^4 + 8x^2 + 3\)
4) \(4x^2 + 2x - 15\)

141 The expression \(\frac{2x + 13}{2x + 6} - \frac{3x - 6}{2x + 6}\) is equivalent to
1) \(\frac{-x + 19}{2(x + 3)}\)
2) \(\frac{-x + 7}{2(x + 3)}\)
3) \(\frac{5x + 19}{2(x + 3)}\)
4) \(\frac{5x + 7}{4x + 12}\)
142 The diagram below shows right triangle $LMP$.

Which ratio represents the tangent of $\angle PLM$?

1) $\frac{3}{4}$  
2) $\frac{3}{5}$  
3) $\frac{4}{3}$  
4) $\frac{5}{4}$

143 Which expression represents $\frac{x^2 - 3x - 10}{x^2 - 25}$ in simplest form?

1) $\frac{2}{5}$  
2) $\frac{x + 2}{x + 5}$  
3) $\frac{x - 2}{x - 5}$  
4) $\frac{-3x - 10}{-25}$

144 If Angelina’s weekly allowance is $d$ dollars, which expression represents her allowance, in dollars, for $x$ weeks?

1) $dx$  
2) $7dx$  
3) $x + 7d$  
4) $\frac{d}{x}$

145 If $s = \frac{2x + t}{r}$, then $x$ equals

1) $\frac{rs - t}{2}$  
2) $\frac{rs + 1}{2}$  
3) $2rs - t$  
4) $rs - 2t$

146 Mr. Taylor raised all his students’ scores on a recent test by five points. How were the mean and the range of the scores affected?

1) The mean increased by five and the range increased by five.  
2) The mean increased by five and the range remained the same.  
3) The mean remained the same and the range increased by five.  
4) The mean remained the same and the range remained the same.

147 The volume of a cylindrical can in $32\pi$ cubic inches. If the height of the can is 2 inches, what is its radius, in inches?

1) 8  
2) 2  
3) 16  
4) 4

148 The sum of $8n^2 - 3n + 10$ and $-3n^2 - 6n - 7$ is

1) $5n^2 - 9n + 3$  
2) $5n^2 - 3n - 17$  
3) $-11n^2 - 9n - 17$  
4) $-11n^2 - 3n + 3$
149 Which ratio represents the cosine of angle \( A \) in the right triangle below?

![Right Triangle](image)

1) \( \frac{3}{5} \)
2) \( \frac{5}{3} \)
3) \( \frac{4}{5} \)
4) \( \frac{4}{3} \)

150 If the roots of a quadratic equation are \(-2\) and \(3\), the equation can be written as

1) \( (x - 2)(x + 3) = 0 \)
2) \( (x + 2)(x - 3) = 0 \)
3) \( (x + 2)(x + 3) = 0 \)
4) \( (x - 2)(x - 3) = 0 \)

151 Carol plans to sell twice as many magazine subscriptions as Jennifer. If Carol and Jennifer need to sell at least 90 subscriptions in all, which inequality could be used to determine how many subscriptions, \( x \), Jennifer needs to sell?

1) \( x \geq 45 \)
2) \( 2x \geq 90 \)
3) \( 2x - x \geq 90 \)
4) \( 2x + x \geq 90 \)

152 Based on the line of best fit drawn below, which value could be expected for the data in June 2015?

![Line of Best Fit](image)

1) 230
2) 310
3) 480
4) 540

153 Three fair coins are tossed. What is the probability that two heads and one tail appear?

1) \( \frac{1}{8} \)
2) \( \frac{3}{8} \)
3) \( \frac{3}{6} \)
4) \( \frac{2}{3} \)

154 Timmy bought a skateboard and two helmets for a total of \( d \) dollars. If each helmet cost \( h \) dollars, the cost of the skateboard could be represented by

1) \( 2dh \)
2) \( \frac{dh}{2} \)
3) \( d - 2h \)
4) \( d - \frac{h}{2} \)
155 If the area of a rectangle is represented by \(x^2 + 8x + 15\) and its length is represented by \(x + 5\), which expression represents the width of the rectangle?
1) \(x + 3\)
2) \(x - 3\)
3) \(x^2 + 6x + 5\)
4) \(x^2 + 7x + 10\)

156 If five times a number is less than 55, what is the greatest possible integer value of the number?
1) 12
2) 11
3) 10
4) 9

157 Peter walked 8,900 feet from home to school.

\[
1 \text{ mile} = 5280 \text{ feet}
\]

How far, to the nearest tenth of a mile, did he walk?
1) 0.5
2) 0.6
3) 1.6
4) 1.7

158 In a given linear equation, the value of the independent variable decreases at a constant rate while the value of the dependent variable increases at a constant rate. The slope of this line is
1) positive
2) negative
3) zero
4) undefined

159 Which graph represents the inequality \(y > 3\)?
1)
2)
3)
4)
160. Which fraction is equivalent to \( \frac{4}{3a} - \frac{5}{2a} \)?

1) \( \frac{1}{a} \)
2) \( \frac{1}{5a} \)
3) \( \frac{-7}{6a} \)
4) \( \frac{-7}{6a^2} \)

161. A scatter plot was constructed on the graph below and a line of best fit was drawn.

![Graph](image)

What is the equation of this line of best fit?
1) \( y = x + 5 \)
2) \( y = x + 25 \)
3) \( y = 5x + 5 \)
4) \( y = 5x + 25 \)

162. Which interval notation describes the set \( S = \{x | 1 \leq x < 10\} \)?

1) \([1, 10]\)
2) \((1, 10]\)
3) \((1, 10)\)
4) \((1,10)\)

163. The equation of the axis of symmetry of the graph of \( y = 2x^2 - 3x + 7 \) is

1) \( x = \frac{3}{4} \)
2) \( y = \frac{3}{4} \)
3) \( x = \frac{3}{2} \)
4) \( y = \frac{3}{2} \)

164. Which expression can be used to change 75 kilometers per hour to meters per minute?

1) \( \frac{75 \text{ km}}{1 \text{ hr}} \times \frac{1 \text{ km}}{1,000 \text{ m}} \times \frac{1 \text{ hr}}{60 \text{ min}} \)
2) \( \frac{75 \text{ km}}{1 \text{ hr}} \times \frac{1 \text{ km}}{1,000 \text{ m}} \times \frac{60 \text{ min}}{1 \text{ hr}} \)
3) \( \frac{75 \text{ km}}{1 \text{ hr}} \times \frac{1,000 \text{ m}}{1 \text{ km}} \times \frac{1 \text{ hr}}{60 \text{ min}} \)
4) \( \frac{75 \text{ km}}{1 \text{ hr}} \times \frac{1,000 \text{ m}}{1 \text{ km}} \times \frac{60 \text{ min}}{1 \text{ hr}} \)

165. There are 18 students in a class. Each day, the teacher randomly selects three students to assist in a game: a leader, a recorder, and a timekeeper. In how many possible ways can the jobs be assigned?

1) 306
2) 816
3) 4896
4) 5832
166 The quotient of \( \frac{8x^5 - 2x^4 + 4x^3 - 6x^2}{2x^2} \) is

1) \( 16x^3 - 4x^6 + 8x^5 - 12x^4 \)
2) \( 4x^7 - x^6 + 2x^5 - 3x^4 \)
3) \( 4x^3 - x^2 + 2x - 3x \)
4) \( 4x^3 - x^2 + 2x - 3 \)

167 Which set of coordinates is a solution of the equation \( 2x - y = 11 \)?

1) \((-6, 1)\)
2) \((-1, 9)\)
3) \((0, 11)\)
4) \((2, -7)\)

168 The expression \( \frac{14 + x}{x^2 - 4} \) is undefined when \( x \) is

1) \(-14, \) only
2) \(2, \) only
3) \(-2 \) or \(2\)
4) \(-14, -2, \) or \(2\)

169 A soda container holds \( \frac{1}{2} \) gallons of soda. How many ounces of soda does this container hold?

1 quart = 32 ounces
1 gallon = 4 quarts

1) 44
2) 176
3) 640
4) 704

170 What is the solution of the system of equations shown in the graph below?

1) \((1, 0) \) and \((-3, 0)\)
2) \((0, -3) \) and \((0, -1)\)
3) \((-1, -2)\)
4) \((-2, -1)\)

171 A bag contains five green gumdrops and six red gumdrops. If Kim pulls a green gumdrop out of the bag and eats it, what is the probability that the next gumdrop she pulls out will be red?

1) \( \frac{5}{11} \)
2) \( \frac{5}{10} \)
3) \( \frac{6}{11} \)
4) \( \frac{6}{10} \)
172 The scatter plot shown below represents a relationship between \( x \) and \( y \).

This type of relationship is
1) a positive correlation
2) a negative correlation
3) a zero correlation
4) not able to be determined

173 The length of a rectangle is 15 and its width is \( w \). The perimeter of the rectangle is, at most, 50. Which inequality can be used to find the longest possible width?
1) \( 30 + 2w < 50 \)
2) \( 30 + 2w \leq 50 \)
3) \( 30 + 2w > 50 \)
4) \( 30 + 2w \geq 50 \)

175 A cube, with faces numbered 1 to 6, is rolled, and a penny is tossed at the same time. How many elements in the sample space consist of an even number and a tail?
1) 12
2) 2
3) 3
4) 4

176 Which type of function is graphed below?

1) linear
2) quadratic
3) exponential
4) absolute value

174 Given:
\( A = \{ \text{perfect square integers from 4-100, inclusive} \} \)
\( B = \{ 16, 36, 49, 64 \} \)
The complement of set \( B \) in the universal set \( A \) is
1) \( \{ 9, 25, 81 \} \)
2) \( \{ 4, 9, 25, 81, 100 \} \)
3) \( \{ 1, 4, 9, 25, 81, 100 \} \)
4) \( \{ 4, 16, 36, 49, 64, 100 \} \)

177 What is the perimeter of the figure shown below, which consists of an isosceles trapezoid and a semicircle?

1) \( 20 + 3\pi \)
2) \( 20 + 6\pi \)
3) \( 26 + 3\pi \)
4) \( 26 + 6\pi \)
178 Which value of \( x \) is the solution of \( \frac{2x - 3}{x - 4} = \frac{2}{3} \)?

1) \( \frac{1}{4} \)
2) \( \frac{1}{4} \)
3) \( -4 \)
4) \( 4 \)

179 What is the range of the data represented in the box-and-whisker plot shown below?

- 1) 40
- 2) 45
- 3) 60
- 4) 100

180 Jack wants to replace the flooring in his rectangular kitchen. He calculates the area of the floor to be 12.8 square meters. The actual area of the floor is 13.5 square meters. What is the relative error in calculating the area of the floor, to the nearest thousandth?

1) 0.051
2) 0.052
3) 0.054
4) 0.055

181 Given: \( Q = \{0, 2, 4, 6\} \)
\( W = \{0, 1, 2, 3\} \)
\( Z = \{1, 2, 3, 4\} \)

What is the intersection of sets \( Q, W, \) and \( Z \)?

1) \{2\}
2) \{0, 2\}
3) \{1, 2, 3\}
4) \{0, 1, 2, 3, 4, 6\}

182 Roger is having a picnic for 78 guests. He plans to serve each guest at least one hot dog. If each package, \( p \), contains eight hot dogs, which inequality could be used to determine how many packages of hot dogs Roger will need to buy?

1) \( p \geq 78 \)
2) \( 8p \geq 78 \)
3) \( 8 + p \geq 78 \)
4) \( 78 - p \geq 8 \)

183 In the diagram below, \( MATH \) is a rectangle, \( GB = 4.6 \), \( MH = 6 \), and \( HT = 15 \).

What is the area of polygon \( MBATH \)?

1) 34.5
2) 55.5
3) 90.0
4) 124.5
184 Which graph can be used to find the solution of the following system of equations?

\[ y = x^2 + 2x + 3 \]
\[ 2y - 2x = 10 \]

1) 
2) 
3) 
4)  

185 Maria has a set of 10 index cards labeled with the digits 0 through 9. She puts them in a bag and selects one at random. The outcome that is most likely to occur is selecting

1) an odd number
2) a prime number
3) a number that is at most 5
4) a number that is divisible by 3

186 The box-and-whisker plot below represents the math test scores of 20 students.

What percentage of the test scores are less than 72?

1) 25
2) 50
3) 75
4) 100

187 Which set of data can be classified as qualitative?

1) scores of students in an algebra class
2) ages of students in a biology class
3) numbers of students in history classes
4) eye colors of students in an economics class

188 A hiker walked 12.8 miles from 9:00 a.m. to noon. He walked an additional 17.2 miles from 1:00 p.m. to 6:00 p.m. What is his average rate for the entire walk, in miles per hour?

1) 3.75
2) 3.86
3) 4.27
4) 7.71
189 Which ratio represents \( \sin x \) in the right triangle shown below?

1) \( \frac{28}{53} \)
2) \( \frac{28}{45} \)
3) \( \frac{45}{53} \)
4) \( \frac{53}{28} \)

190 Which equation represents a quadratic function?

1) \( y = x + 2 \)
2) \( y = |x + 2| \)
3) \( y = x^2 \)
4) \( y = 2^x \)

191 This year, John played in 10 baseball games. In these games he had hit the ball 2, 3, 0, 1, 3, 2, 4, 0, 2, and 3 times. In the first 10 games he plays next year, John wants to increase his average (mean) hits per game by 0.5. What is the total number of hits John needs over the first 10 games next year to achieve his goal?

1) 5
2) 2
3) 20
4) 25

192 What are the vertex and axis of symmetry of the parabola shown in the diagram below?

1) vertex: \((1, -4)\); axis of symmetry: \(x = 1\)
2) vertex: \((1, -4)\); axis of symmetry: \(x = -4\)
3) vertex: \((-4, 1)\); axis of symmetry: \(x = 1\)
4) vertex: \((-4, 1)\); axis of symmetry: \(x = -4\)

193 The number of calories burned while jogging varies directly with the number of minutes spent jogging. If George burns 150 calories by jogging for 20 minutes, how many calories does he burn by jogging for 30 minutes?

1) 100
2) 180
3) 200
4) 225

194 An example of an algebraic expression is

1) \(x + 2\)
2) \(y = x + 2\)
3) \(y < x + 2\)
4) \(y = x^2 + 2x\)
195 Which expression is equivalent to \(3^3 \cdot 3^4\)?
   1) \(9^{12}\)
   2) \(9^7\)
   3) \(3^{12}\)
   4) \(3^7\)

196 What is the slope of the line whose equation is \(3x - 7y = 9\)?
   1) \(-\frac{3}{7}\)
   2) \(\frac{3}{7}\)
   3) \(-\frac{7}{3}\)
   4) \(\frac{7}{3}\)

197 The figure shown below is composed of two rectangles and a quarter circle.

What is the area of this figure, to the nearest square centimeter?
   1) 33
   2) 37
   3) 44
   4) 58

198 A survey is being conducted to determine which school board candidate would best serve the Yonkers community. Which group, when randomly surveyed, would likely produce the most bias?
   1) 15 employees of the Yonkers school district
   2) 25 people driving past Yonkers High School
   3) 75 people who enter a Yonkers grocery store
   4) 100 people who visit the local Yonkers shopping mall

199 Four hundred licensed drivers participated in the math club's survey on driving habits. The table below shows the number of drivers surveyed in each age group.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Number of Drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-25</td>
<td>150</td>
</tr>
<tr>
<td>26-35</td>
<td>129</td>
</tr>
<tr>
<td>36-45</td>
<td>33</td>
</tr>
<tr>
<td>46-55</td>
<td>57</td>
</tr>
<tr>
<td>56-65</td>
<td>31</td>
</tr>
</tbody>
</table>

Which statement best describes a conclusion based on the data in the table?
   1) It may be biased because no one younger than 16 was surveyed.
   2) It would be fair because many different age groups were surveyed.
   3) It would be fair because the survey was conducted by the math club students.
   4) It may be biased because the majority of drivers surveyed were in the younger age intervals.
Three high school juniors, Reese, Matthew, and Chris, are running for student council president. A survey is taken a week before the election asking 40 students which candidate they will vote for in the election. The results are shown in the table below.

<table>
<thead>
<tr>
<th>Candidate's Name</th>
<th>Number of Students Supporting Candidate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reese</td>
<td>15</td>
</tr>
<tr>
<td>Matthew</td>
<td>13</td>
</tr>
<tr>
<td>Chris</td>
<td>12</td>
</tr>
</tbody>
</table>

Based on the table, what is the probability that a student will vote for Reese?
1) $\frac{1}{3}$
2) $\frac{3}{5}$
3) $\frac{3}{8}$
4) $\frac{5}{8}$

What is $\frac{7}{12x} - \frac{y}{6x^2}$ expressed in simplest form?
1) $\frac{7-y}{6x}$
2) $\frac{7-y}{12x - 6x^2}$
3) $\frac{-7y}{12x^2}$
4) $\frac{7x - 2y}{12x^2}$

In the diagram below, what is the slope of the line passing through points $A$ and $B$?
1) $-2$
2) $2$
3) $-\frac{1}{2}$
4) $\frac{1}{2}$

Which phrase best describes the relationship between the number of miles driven and the amount of gasoline used?
1) causal, but not correlated
2) correlated, but not causal
3) both correlated and causal
4) neither correlated nor causal

The current student population of the Brentwood Student Center is 2,000. The enrollment at the center increases at a rate of 4% each year. To the nearest whole number, what will the student population be closest to in 3 years?
1) 2,240
2) 2,250
3) 5,488
4) 6,240
205 The maximum height and speed of various roller coasters in North America are shown in the table below.

<table>
<thead>
<tr>
<th>Maximum Speed, in mph, (x)</th>
<th>45</th>
<th>50</th>
<th>54</th>
<th>60</th>
<th>65</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Height, in feet, (y)</td>
<td>63</td>
<td>80</td>
<td>105</td>
<td>118</td>
<td>141</td>
<td>107</td>
</tr>
</tbody>
</table>

Which graph represents a correct scatter plot of the data?

1)  
2)  
3)  
4)  

206 A formula used for calculating velocity is \( v = \frac{1}{2} at^2 \). What is \( a \) expressed in terms of \( v \) and \( t \)?

1)  \( a = \frac{2v}{t} \)
2)  \( a = \frac{2v}{t^2} \)
3)  \( a = \frac{v}{t} \)
4)  \( a = \frac{v}{2t^2} \)

207 Which equation illustrates the associative property?

1)  \( x + y + z = x + y + z \)
2)  \( x(y + z) = xy + xz \)
3)  \( x + y + z = z + y + x \)
4)  \( (x + y) + z = x + (y + z) \)

208 The sum of \( 4x^3 + 6x^2 + 2x - 3 \) and \( 3x^3 + 3x^2 - 5x - 5 \) is

1)  \( 7x^3 + 3x^2 - 3x - 8 \)
2)  \( 7x^3 + 3x^2 + 7x + 2 \)
3)  \( 7x^3 + 9x^2 - 3x - 8 \)
4)  \( 7x^6 + 9x^4 - 3x^2 - 8 \)

209 Which algebraic expression represents 15 less than \( x \) divided by 9?

1)  \( \frac{x}{9} - 15 \)
2)  \( 9x - 15 \)
3)  \( 15 - \frac{x}{9} \)
4)  \( 15 - 9x \)
210  In \( \triangle ABC \), the measure of \( \angle B = 90^\circ \), \( AC = 50 \), \( AB = 48 \), and \( BC = 14 \). Which ratio represents the tangent of \( \angle A \)?

1) \( \frac{14}{50} \)  
2) \( \frac{14}{48} \)  
3) \( \frac{48}{50} \)  
4) \( \frac{48}{14} \)

211  Tim ate four more cookies than Alice. Bob ate twice as many cookies as Tim. If \( x \) represents the number of cookies Alice ate, which expression represents the number of cookies Bob ate?

1) \( 2 + (x + 4) \)  
2) \( 2x + 4 \)  
3) \( 2(x + 4) \)  
4) \( 4(x + 2) \)

212  What is the slope of the line that passes through the points \((3, 5)\) and \((-2, 2)\)?

1) \( \frac{1}{5} \)  
2) \( \frac{3}{5} \)  
3) \( \frac{5}{3} \)  
4) 5

213  Which interval notation represents the set of all real numbers greater than 2 and less than or equal to 20?

1) \((2, 20]\)  
2) \((2, 20]\)  
3) \([2, 20]\)  
4) \([2, 20]\)

214  Which expression represents \( \frac{-14a^2c^8}{7a^3c^2} \) in simplest form?

1) \( -2ac^6 \)  
2) \( -2ac^4 \)  
3) \( \frac{-2c^4}{a} \)  
4) \( \frac{-2c^6}{a} \)

215  Which data set describes a situation that could be classified as quantitative?

1) the phone numbers in a telephone book  
2) the addresses for students at Hopkins High School  
3) the zip codes of residents in the city of Buffalo, New York  
4) the time it takes each of Mr. Harper’s students to complete a test

216  Steve ran a distance of 150 meters in \( 1 \frac{1}{2} \) minutes. What is his speed in meters per hour?

1) 6  
2) 60  
3) 100  
4) 6,000

217  What is the solution of the inequality \(-6x - 17 \geq 8x + 25\)?

1) \( x \geq 3 \)  
2) \( x \leq 3 \)  
3) \( x \geq -3 \)  
4) \( x \leq -3 \)
218 Which expression represents $\frac{12x^3 - 6x^2 + 2x}{2x}$ in simplest form?

1) $6x^2 - 3x$
2) $10x^2 - 4x$
3) $6x^2 - 3x + 1$
4) $10x^2 - 4x + 1$

219 The value, $y$, of a $15,000 investment over $x$ years is represented by the equation $y = 15000(1.2)^x$. What is the profit (interest) on a 6-year investment?

1) $6,600$
2) $10,799$
3) $21,600$
4) $25,799$

220 What is the solution of the system of equations $c + 3d = 8$ and $c = 4d - 6$?

1) $c = -14, d = -2$
2) $c = -2, d = 2$
3) $c = 2, d = 2$
4) $c = 14, d = -2$

221 Which set-builder notation describes $\{-3, -2, -1, 0, 1, 2\}$?

1) $\{x| -3 \leq x < 2, \text{ where } x \text{ is an integer}\}$
2) $\{x| -3 < x \leq 2, \text{ where } x \text{ is an integer}\}$
3) $\{x| -3 < x < 2, \text{ where } x \text{ is an integer}\}$
4) $\{x| -3 \leq x \leq 2, \text{ where } x \text{ is an integer}\}$

222 Factored completely, the expression $3x^2 - 3x - 18$ is equivalent to

1) $3(x^2 - x - 6)$
2) $3(x - 3)(x + 2)$
3) $(3x - 9)(x + 2)$
4) $(3x + 6)(x - 3)$

223 How many square inches of wrapping paper are needed to entirely cover a box that is 2 inches by 3 inches by 4 inches?

1) 18
2) 24
3) 26
4) 52

224 Given: $X = \{1, 2, 3, 4\}$
$Y = \{2, 3, 4, 5\}$
$Z = \{3, 4, 5, 6\}$
What is the intersection of sets $X$, $Y$, and $Z$?

1) $\{3, 4\}$
2) $\{2, 3, 4\}$
3) $\{3, 4, 5\}$
4) $\{1, 2, 3, 4, 5, 6\}$

225 The length of a rectangle is 3 inches more than its width. The area of the rectangle is 40 square inches. What is the length, in inches, of the rectangle?

1) 5
2) 8
3) 8.5
4) 11.5
226 Corinne calculated the area of a paper plate to be 50.27 square inches. If the actual area of the plate is 55.42 square inches, what is the relative error in calculating the area, to the nearest thousandth?

1) 0.092
2) 0.093
3) 0.102
4) 0.103

227 A figure is made up of a rectangle and a semicircle as shown in the diagram below.

What is the area of the figure, to the nearest tenth of a square centimeter?

1) 39.4
2) 44.1
3) 48.8
4) 58.3

228 The probability that it will snow on Sunday is \( \frac{3}{5} \). The probability that it will snow on both Sunday and Monday is \( \frac{3}{10} \). What is the probability that it will snow on Monday, if it snowed on Sunday?

1) \( \frac{9}{50} \)
2) \( 2 \)
3) \( \frac{1}{2} \)
4) \( \frac{9}{10} \)

229 In a science fiction novel, the main character found a mysterious rock that decreased in size each day. The table below shows the part of the rock that remained at noon on successive days.

<table>
<thead>
<tr>
<th>Day</th>
<th>Fractional Part of the Rock Remaining</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>( \frac{1}{2} )</td>
</tr>
<tr>
<td>2</td>
<td>( \frac{1}{4} )</td>
</tr>
<tr>
<td>3</td>
<td>( \frac{1}{8} )</td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Which fractional part of the rock will remain at noon on day 7?

1) \( \frac{1}{128} \)
2) \( \frac{1}{64} \)
3) \( \frac{1}{14} \)
4) \( \frac{1}{12} \)

230 Which verbal expression can be represented by \( 2(x - 5) \)?

1) \( 5 \) less than \( 2 \) times \( x \)
2) \( 2 \) multiplied by \( x \) less than \( 5 \)
3) twice the difference of \( x \) and \( 5 \)
4) the product of \( 2 \) and \( x \), decreased by \( 5 \)

231 What is the solution set of \( \frac{x + 2}{x - 2} = \frac{-3}{x} \)?

1) \{ -2, 3 \}
2) \{ -3, -2 \}
3) \{ -1, 6 \}
4) \{ -6, 1 \}
232 The end of a dog's leash is attached to the top of a 5-foot-tall fence post, as shown in the diagram below. The dog is 7 feet away from the base of the fence post.

How long is the leash, to the nearest tenth of a foot?
1) 4.9
2) 8.6
3) 9.0
4) 12.0

233 If \( \frac{ey}{n} + k = t \), what is \( y \) in terms of \( e \), \( n \), \( k \), and \( t \)?
1) \( y = \frac{tn + k}{e} \)
2) \( y = \frac{tn - k}{e} \)
3) \( y = \frac{n(t + k)}{e} \)
4) \( y = \frac{n(t - k)}{e} \)

234 The value of a car purchased for $20,000 decreases at a rate of 12% per year. What will be the value of the car after 3 years?
1) $12,800.00
2) $13,629.44
3) $17,600.00
4) $28,098.56

235 Which graph represents a function?
236 In right triangle $ABC$ shown below, $AB = 18.3$ and $BC = 11.2$. What is the measure of $\angle A$, to the nearest tenth of a degree?

1) 31.5  
2) 37.7  
3) 52.3  
4) 58.5

237 Which equation represents the line that passes through the point $(1,5)$ and has a slope of $-2$?

1) $y = -2x + 7$  
2) $y = -2x + 11$  
3) $y = 2x - 9$  
4) $y = 2x + 3$

238 What are the factors of the expression $x^2 + x - 20$?

1) $(x + 5)$ and $(x + 4)$  
2) $(x + 5)$ and $(x - 4)$  
3) $(x - 5)$ and $(x + 4)$  
4) $(x - 5)$ and $(x - 4)$

239 The expression $\sqrt{72} - 3\sqrt{2}$ written in simplest radical form is

1) $5\sqrt{2}$  
2) $3\sqrt{6}$  
3) $3\sqrt{2}$  
4) $\sqrt{6}$

240 A study showed that a decrease in the cost of carrots led to an increase in the number of carrots sold. Which statement best describes this relationship?

1) positive correlation and a causal relationship  
2) negative correlation and a causal relationship  
3) positive correlation and not a causal relationship  
4) negative correlation and not a causal relationship

241 A garden is in the shape of an isosceles trapezoid and a semicircle, as shown in the diagram below. A fence will be put around the perimeter of the entire garden. Which expression represents the length of fencing, in meters, that will be needed?

1) $22 + 6\pi$  
2) $22 + 12\pi$  
3) $15 + 6\pi$  
4) $15 + 12\pi$
424 Given: \( U = \{1, 2, 3, 4, 5, 6, 7, 8\} \)
\( B = \{2, 3, 5, 6\} \)

Set \( B \) is a subset of set \( U \). What is the complement of set \( B \)?
1) \( \{\} \)
2) \( \{2, 3, 5, 6\} \)
3) \( \{1, 4, 7, 8\} \)
4) \( \{1, 2, 3, 4, 5, 6, 7, 8\} \)

423 Which situation does not describe a causal relationship?
1) The higher the volume on a radio, the louder the sound will be.
2) The faster a student types a research paper, the more pages the paper will have.
3) The shorter the distance driven, the less gasoline that will be used.
4) The slower the pace of a runner, the longer it will take the runner to finish the race.

424 Which equation has roots of \(-3\) and \(5\)?
1) \( x^2 + 2x - 15 = 0 \)
2) \( x^2 - 2x - 15 = 0 \)
3) \( x^2 + 2x + 15 = 0 \)
4) \( x^2 - 2x + 15 = 0 \)

425 Which relation is a function?
1) \( \left\{ \left( \frac{3}{4}, 0 \right), (0, 1), \left( \frac{3}{4}, 2 \right) \right\} \)
2) \( \left\{ (-2, 2), \left( -\frac{1}{2}, 1 \right), (-2, 4) \right\} \)
3) \( \{(-1, 4), (0, 5), (0, 4)\} \)
4) \( \{(2, 1), (4, 3), (6, 5)\} \)

426 Which table does not show bivariate data?
1) 

<table>
<thead>
<tr>
<th>Gallons</th>
<th>Miles Driven</th>
</tr>
</thead>
<tbody>
<tr>
<td>39</td>
<td>50</td>
</tr>
<tr>
<td>48</td>
<td>70</td>
</tr>
<tr>
<td>60</td>
<td>90</td>
</tr>
</tbody>
</table>

2) 

<table>
<thead>
<tr>
<th>Quiz Average</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>12</td>
</tr>
<tr>
<td>80</td>
<td>15</td>
</tr>
<tr>
<td>90</td>
<td>6</td>
</tr>
</tbody>
</table>

3) 

<table>
<thead>
<tr>
<th>Speed (mph)</th>
<th>Distance (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>80</td>
</tr>
<tr>
<td>50</td>
<td>120</td>
</tr>
<tr>
<td>55</td>
<td>150</td>
</tr>
</tbody>
</table>

4)

427 Which set of data describes a situation that could be classified as qualitative?
1) the colors of the birds at the city zoo
2) the shoe size of the zookeepers at the city zoo
3) the heights of the giraffes at the city zoo
4) the weights of the monkeys at the city zoo

428 An example of an algebraic expression is
1) \( \frac{2x + 3}{7} = \frac{13}{x} \)
2) \( (2x + 1)(x - 7) \)
3) \( 4x - 1 = 4 \)
4) \( x = 2 \)
249 Debbie solved the linear equation \(3(x + 4) - 2 = 16\) as follows:

[Line 1] \(3(x + 4) - 2 = 16\)
[Line 2] \(3(x + 4) = 18\)
[Line 3] \(3x + 4 = 18\)
[Line 4] \(3x = 14\)
[Line 5] \(x = \frac{4 \frac{2}{3}}{3}\)

She made an error between lines
1) 1 and 2
2) 2 and 3
3) 3 and 4
4) 4 and 5

250 What is the slope of the line passing through the points \((-2,4)\) and \((3,6)\)?
1) \(-\frac{5}{2}\)
2) \(-\frac{2}{5}\)
3) \(\frac{2}{5}\)
4) \(\frac{5}{2}\)

252 Which expression represents \(\frac{x^2 - x - 6}{x^2 - 5x + 6}\) in simplest form?
1) \(\frac{x + 2}{x - 2}\)
2) \(\frac{-x - 6}{-5x + 6}\)
3) \(\frac{1}{5}\)
4) \(-1\)

253 What is the slope of the line passing through the points \(A\) and \(B\), as shown on the graph below?

251 Given: Set \(U = \{S, O, P, H, I, A\}\)

Set \(B = \{A, I, O\}\)

If set \(B\) is a subset of set \(U\), what is the complement of set \(B\)?
1) \(\{O, P, S\}\)
2) \(\{I, P, S\}\)
3) \(\{A, H, P\}\)
4) \(\{H, P, S\}\)
254 The rectangle shown below has a diagonal of 18.4 cm and a width of 7 cm.

To the nearest centimeter, what is the length, \(x\), of the rectangle?
1) 11
2) 17
3) 20
4) 25

255 What is the sum of \(\frac{3x^2}{x-2}\) and \(\frac{x^2}{x-2}\)?
1) \(\frac{3x^4}{(x-2)^2}\)
2) \(\frac{3x^4}{x-2}\)
3) \(\frac{4x^2}{(x-2)^2}\)
4) \(\frac{4x^2}{x-2}\)

256 A right triangle contains a 38° angle whose adjacent side measures 10 centimeters. What is the length of the hypotenuse, to the nearest hundredth of a centimeter?
1) 7.88
2) 12.69
3) 12.80
4) 16.24

257 A student correctly graphed the parabola shown below to solve a given quadratic equation.

What are the roots of the quadratic equation associated with this graph?
1) –6 and 3
2) –6 and 0
3) –3 and 2
4) –2 and 3

258 Which verbal expression is represented by \(\frac{1}{2} (n – 3)\)?
1) one-half \(n\) decreased by 3
2) one-half \(n\) subtracted from 3
3) the difference of one-half \(n\) and 3
4) one-half the difference of \(n\) and 3

259 The expression \(6\sqrt{50} + 6\sqrt{2}\) written in simplest radical form is
1) \(6\sqrt{52}\)
2) \(12\sqrt{52}\)
3) \(17\sqrt{2}\)
4) \(36\sqrt{2}\)
260 Which data table represents univariate data?

1) Side Length of a Square | Area of Square
   |                   |
   | 2                 | 4               |
   | 3                 | 9               |
   | 4                 | 16              |
   | 5                 | 25              |

2) Hours Worked | Pay
   |           |
   | 20        | $160           |
   | 25        | $200           |
   | 30        | $240           |
   | 35        | $280           |

3) Age Group | Frequency
   |         |
   | 20–29   | 9            |
   | 30–39   | 7            |
   | 40–49   | 10           |
   | 50–59   | 4            |

4) People | Number of Fingers
   |            |
   | 2          | 20           |
   | 3          | 30           |
   | 4          | 40           |
   | 5          | 50           

261 How many different sandwiches consisting of one type of cheese, one condiment, and one bread choice can be prepared from five types of cheese, two condiments, and three bread choices?

1) 10
2) 13
3) 15
4) 30

262 What is the equation of the axis of symmetry of the parabola shown in the diagram below?

1) $x = -0.5$
2) $x = 2$
3) $x = 4.5$
4) $x = 13$

263 What is an equation of the axis of symmetry of the parabola represented by $y = -x^2 + 6x - 4$?

1) $x = 3$
2) $y = 3$
3) $x = 6$
4) $y = 6$

264 The ninth grade class at a local high school needs to purchase a park permit for $250.00 for their upcoming class picnic. Each ninth grader attending the picnic pays $0.75. Each guest pays $1.25. If 200 ninth graders attend the picnic, which inequality can be used to determine the number of guests, $x$, needed to cover the cost of the permit?

1) $0.75x - (1.25)(200) \geq 250.00$
2) $0.75x + (1.25)(200) \geq 250.00$
3) $(0.75)(200) - 1.25x \geq 250.00$
4) $(0.75)(200) + 1.25x \geq 250.00$
265 Which graph represents an exponential equation?

1) [Graph Image]

2) [Graph Image]

3) [Graph Image]

4) [Graph Image]

266 What is an equation of the line that passes through the points (1, 3) and (8, 5)?

1) \( y + 1 = \frac{2}{7} (x + 3) \)

2) \( y - 5 = \frac{2}{7} (x - 8) \)

3) \( y - 1 = \frac{2}{7} (x + 3) \)

4) \( y + 5 = \frac{2}{7} (x - 8) \)

267 Which equation represents a line parallel to the graph of \( 2x - 4y = 16 \)?

1) \( y = \frac{1}{2} x - 5 \)

2) \( y = -\frac{1}{2} x + 4 \)

3) \( y = -2x + 6 \)

4) \( y = 2x + 8 \)

268 What is \( \frac{2 + x}{5x} - \frac{x - 2}{5x} \) expressed in simplest form?

1) 0

2) \( \frac{2}{5} \)

3) \( \frac{4}{5x} \)

4) \( \frac{2x + 4}{5x} \)
269 The graph of the equation $y = |x|$ is shown in the diagram below.

Which diagram could represent a graph of the equation $y = a|x|$ when $-1 < a < 0$?

270 The members of the senior class are planning a dance. They use the equation $r = pn$ to determine the total receipts. What is $n$ expressed in terms of $r$ and $p$?
1) $n = r + p$
2) $n = r - p$
3) $n = \frac{p}{r}$
4) $n = \frac{r}{p}$

271 If Ann correctly factors an expression that is the difference of two perfect squares, her factors could be
1) $(2x + y)(x - 2y)$
2) $(2x + 3y)(2x - 3y)$
3) $(x - 4)(x - 4)$
4) $(2y - 5)(y - 5)$

272 Melissa graphed the equation $y = x^2$ and Dave graphed the equation $y = -3x^2$ on the same coordinate grid. What is the relationship between the graphs that Melissa and Dave drew?
1) Dave's graph is wider and opens in the opposite direction from Melissa's graph.
2) Dave's graph is narrower and opens in the opposite direction from Melissa's graph.
3) Dave's graph is wider and is three units below Melissa's graph.
4) Dave's graph is narrower and is three units to the left of Melissa's graph.
273 Which ordered pair is in the solution set of the following system of linear inequalities?

\[
\begin{align*}
y &< 2x + 2 \\
y &\geq -x - 1
\end{align*}
\]

1) (0, 3)  
2) (2, 0)  
3) (−1, 0)  
4) (−1, −4)

274 Which value of \(x\) is the solution of \(\frac{x}{3} + \frac{x+1}{2} = x\)?

1) 1  
2) −1  
3) 3  
4) −3

275 The vertex of the parabola \(y = x^2 + 8x + 10\) lies in

1) I  
2) II  
3) III  
4) IV

276 Which relation represents a function?

1) \{(0, 3), (2, 4), (0, 6)\}  
2) \{(-7, 5), (-7, 1), (-10, 3), (-4, 3)\}  
3) \{(2, 0), (6, 2), (6, -2)\}  
4) \{(-6, 5), (-3, 2), (1, 2), (6, 5)\}

277 Which equation represents a line parallel to the \(y\)-axis?

1) \(x = y\)  
2) \(x = 4\)  
3) \(y = 4\)  
4) \(y = x + 4\)

278 The scatter plot below represents the relationship between the number of peanuts a student eats and the student's bowling score.

Which conclusion about the scatter plot is valid?

1) There is almost no relationship between eating peanuts and bowling score.  
2) Students who eat more peanuts have higher bowling scores.  
3) Students who eat more peanuts have lower bowling scores.  
4) No bowlers eat peanuts.

279 How many different ways can five books be arranged on a shelf?

1) 5  
2) 15  
3) 25  
4) 120
280 A bag contains eight green marbles, five white marbles, and two red marbles. What is the probability of drawing a red marble from the bag?

1) \( \frac{1}{15} \)
2) \( \frac{2}{15} \)
3) \( \frac{2}{13} \)
4) \( \frac{13}{15} \)

281 Which ordered pair is in the solution set of the system of inequalities shown in the graph below?

1) \((-2,-1)\)
2) \((-2,2)\)
3) \((-2,-4)\)
4) \((2,-2)\)

282 What is the solution of \(3(2m - 1) \leq 4m + 7\)?

1) \(m \leq 5\)
2) \(m \geq 5\)
3) \(m \leq 4\)
4) \(m \geq 4\)

283 What is the sum of \(\frac{3}{2x}\) and \(\frac{7}{4x}\)?

1) \(\frac{21}{8x^2}\)
2) \(\frac{13}{4x}\)
3) \(\frac{10}{6x}\)
4) \(\frac{13}{8x}\)

284 Which type of function is represented by the graph shown below?

1) absolute value
2) exponential
3) linear
4) quadratic

285 What is \(3\sqrt{250}\) expressed in simplest radical form?

1) \(5\sqrt{10}\)
2) \(8\sqrt{10}\)
3) \(15\sqrt{10}\)
4) \(75\sqrt{10}\)
286 Right triangle $ABC$ has legs of 8 and 15 and a hypotenuse of 17, as shown in the diagram below.

The value of the tangent of $\angle B$ is
1) 0.4706
2) 0.5333
3) 0.8824
4) 1.8750

287 The spinner shown in the diagram below is divided into six equal sections.

Which outcome is least likely to occur on a single spin?
1) an odd number
2) a prime number
3) a perfect square
4) a number divisible by 2

288 When $5x + 4y$ is subtracted from $5x - 4y$, the difference is
1) 0
2) $10x$
3) $8y$
4) $-8y$

289 Sam’s grades on eleven chemistry tests were 90, 85, 76, 63, 94, 89, 81, 76, 78, 69, and 97. Which statement is true about the measures of central tendency?
1) mean > mode
2) mean < median
3) mode > median
4) median = mean

290 The width of a rectangle is 3 less than twice the length, $x$. If the area of the rectangle is 43 square feet, which equation can be used to find the length, in feet?
1) $2x(x - 3) = 43$
2) $x(3 - 2x) = 43$
3) $2x + 2(2x - 3) = 43$
4) $x(2x - 3) = 43$

291 When 36 is subtracted from the square of a number, the result is five times the number. What is the positive solution?
1) 9
2) 6
3) 3
4) 4
292 How many different three-letter arrangements can be formed using the letters in the word *ABSOLUTE* if each letter is used only once?
1) 56
2) 112
3) 168
4) 336

293 What is the sum of \( \frac{-x + 7}{2x + 4} \) and \( \frac{2x + 5}{2x + 4} \)?
1) \( \frac{x + 12}{2x + 4} \)
2) \( \frac{3x + 12}{2x + 4} \)
3) \( \frac{x + 12}{4x + 8} \)
4) \( \frac{3x + 12}{4x + 8} \)

294 Which set represents the intersection of sets A, B, and C shown in the diagram below?
1) \{3, 4, 5, 6, 7\}
2) \{2\}
3) \{2, 3, 4, 5, 6, 7\}
4) \{1, 2, 3, 4, 5, 6, 7, 8, 9\}

295 Which notation describes \{1, 2, 3\}?  
1) \{x | 1 \leq x < 3, \text{ where } x \text{ is an integer}\}  
2) \{x | 0 < x \leq 3, \text{ where } x \text{ is an integer}\}  
3) \{x | 1 < x < 3, \text{ where } x \text{ is an integer}\}  
4) \{x | 0 \leq x \leq 3, \text{ where } x \text{ is an integer}\}

296 The value of the expression \(-|a - b|\) when \(a = 7\) and \(b = -3\) is
1) \(-10\)
2) \(10\)
3) \(-4\)
4) \(4\)

297 Which point lies on the line whose equation is \(2x - 3y = 9\)?
1) \((-1, -3)\)
2) \((-1, 3)\)
3) \((0, 3)\)
4) \((0, -3)\)

298 What is the result when \(2x^2 + 3xy - 6\) is subtracted from \(x^2 - 7xy + 2\)?
1) \(-x^2 - 10xy + 8\)
2) \(x^2 + 10xy - 8\)
3) \(-x^2 - 4xy - 4\)
4) \(x^2 - 4xy - 4\)
299 The freshman class held a canned food drive for 12 weeks. The results are summarized in the table below.

<table>
<thead>
<tr>
<th>Week</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cans</td>
<td>20</td>
<td>35</td>
<td>32</td>
<td>45</td>
<td>46</td>
<td>58</td>
<td>28</td>
<td>23</td>
<td>31</td>
<td>79</td>
<td>65</td>
<td>62</td>
</tr>
</tbody>
</table>

Which number represents the second quartile of the number of cans of food collected?
1) 29.5
2) 30.5
3) 40
4) 60

300 Which point is on the line $4y - 2x = 0$?
1) $(-2, -1)$
2) $(-2, 1)$
3) $(-1, -2)$
4) $(1, 2)$

301 The legs of an isosceles right triangle each measure 10 inches. What is the length of the hypotenuse of this triangle, to the nearest tenth of an inch?
1) 6.3
2) 7.1
3) 14.1
4) 17.1

302 If the universal set is \{pennies, nickels, dimes, quarters\}, what is the complement of the set \{nickels\}?
1) \{\}
2) \{pennies, quarters\}
3) \{pennies, dimes, quarters\}
4) \{pennies, nickels, dimes, quarters\}

303 Which ordered pair is a solution to the system of equations $y = x + 3$ and $y = x^2 - x$?
1) $(6, 9)$
2) $(3, 6)$
3) $(3, -1)$
4) $(2, 5)$

304 Which quadrant will be completely shaded in the graph of the inequality $y \leq 2x$?
1) Quadrant I
2) Quadrant II
3) Quadrant III
4) Quadrant IV

305 In a recent town election, 1,860 people voted for either candidate $A$ or candidate $B$ for the position of supervisor. If candidate $A$ received 55% of the votes, how many votes did candidate $B$ receive?
1) 186
2) 837
3) 1,023
4) 1,805

306 What is the solution of the system of equations $2x - 5y = 11$ and $-2x + 3y = -9$?
1) $(-3, -1)$
2) $(-1, 3)$
3) $(3, -1)$
4) $(3, 1)$
307 What is the value of the expression \((a^3 + b^0)^2\) when \(a = -2\) and \(b = 4\)?
1) 64  
2) 49  
3) -49  
4) -64

308 Which is the graph of \(y = |x| + 2\)?

309 What is \(3\sqrt{2} + \sqrt{8}\) expressed in simplest radical form?
1) \(3\sqrt{10}\)  
2) \(3\sqrt{16}\)  
3) \(5\sqrt{2}\)  
4) \(7\sqrt{2}\)

310 When \(a^3 - 4a\) is factored completely, the result is
1) \((a - 2)(a + 2)\)  
2) \(a(a - 2)(a + 2)\)  
3) \(a^2(a - 4)\)  
4) \(a(a - 2)^2\)

311 Which expression is equivalent to \(121 - x^2\)?
1) \((x - 11)(x - 11)\)  
2) \((x + 11)(x - 11)\)  
3) \((11 - x)(11 + x)\)  
4) \((11 - x)(11 - x)\)

312 Which situation describes a correlation that is not a causal relationship?
1) the length of the edge of a cube and the volume of the cube  
2) the distance traveled and the time spent driving  
3) the age of a child and the number of siblings the child has  
4) the number of classes taught in a school and the number of teachers employed
313 Which value of \( x \) is the solution of the equation \( \frac{2}{3} x + \frac{1}{2} = \frac{5}{6} \)?

1) \( \frac{1}{2} \)
2) \( 2 \)
3) \( \frac{2}{3} \)
4) \( \frac{3}{2} \)

314 How many cubes with 5-inch sides will completely fill a cube that is 10 inches on a side?

1) 50
2) 25
3) 8
4) 4

315 What is the product of \( (6 \times 10^3) \), \( (4.6 \times 10^5) \), and \( (2 \times 10^{-2}) \) expressed in scientific notation?

1) \( 55.2 \times 10^6 \)
2) \( 5.52 \times 10^7 \)
3) \( 55.2 \times 10^7 \)
4) \( 5.52 \times 10^{10} \)

316 The expression \( x^2 - 36y^2 \) is equivalent to

1) \( (x - 6y)(x - 6y) \)
2) \( (x - 18y)(x - 18y) \)
3) \( (x + 6y)(x - 6y) \)
4) \( (x + 18y)(x - 18y) \)

317 Ben has four more than twice as many CDs as Jake. If they have a total of 31 CDs, how many CDs does Jake have?

1) 9
2) 13
3) 14
4) 22

318 Michael is 25 years younger than his father. The sum of their ages is 53. What is Michael’s age?

1) 14
2) 25
3) 28
4) 39

319 Which ordered pair is a solution of the system of equations shown in the graph below?
320 Which scatter plot shows the relationship between \( x \) and \( y \) if \( x \) represents a student score on a test and \( y \) represents the number of incorrect answers a student received on the same test?

1) \[
\begin{array}{c}
\text{Number of Incorrect Answers} \\
\text{Test Scores}
\end{array}
\]

2) \[
\begin{array}{c}
\text{Number of Incorrect Answers} \\
\text{Test Scores}
\end{array}
\]

3) \[
\begin{array}{c}
\text{Number of Incorrect Answers} \\
\text{Test Scores}
\end{array}
\]

4) \[
\begin{array}{c}
\text{Number of Incorrect Answers} \\
\text{Test Scores}
\end{array}
\]

---

321 Josh and Mae work at a concession stand. They each earn $8 per hour. Josh worked three hours more than Mae. If Josh and Mae earned a total of $120, how many hours did Josh work?

1) 6
2) 9
3) 12
4) 15

322 Based on the box-and-whisker plot below, which statement is \textit{false}?

1) The median is 7.
2) The range is 12.
3) The first quartile is 4.
4) The third quartile is 11.

323 Which equation represents the line that passes through the points \((-3, 7)\) and \((3, 3)\)?

1) \( y = \frac{2}{3} x + 1 \)
2) \( y = \frac{2}{3} x + 9 \)
3) \( y = -\frac{2}{3} x + 5 \)
4) \( y = -\frac{2}{3} x + 9 \)
324 The quotient of \((9.2 \times 10^6)\) and \((2.3 \times 10^3)\) expressed in scientific notation is

1) 4,000
2) 40,000
3) \(4 \times 10^3\)
4) \(4 \times 10^4\)

325 A spinner that is equally divided into eight numbered sectors is spun 20 times. The table below shows the number of times the arrow landed in each numbered sector.

<table>
<thead>
<tr>
<th>Spinner Sector</th>
<th>Number of Times</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
</tr>
</tbody>
</table>

Based on the table, what is the empirical probability that the spinner will land on a prime number on the next spin?

1) \(\frac{9}{20}\)
2) \(\frac{11}{20}\)
3) \(\frac{12}{20}\)
4) \(\frac{14}{20}\)

326 Which graph could be used to find the solution of the system of equations \(y = 2x + 6\) and \(y = x^2 + 4x + 3\)?

1) 
2) 
3) 
4)
327 The expression \( \frac{12w^9y^3}{-3w^3y^3} \) is equivalent to

1) \(-4w^6\)
2) \(-4w^3y\)
3) \(9w^6\)
4) \(9w^3y\)

328 What is the perimeter of a regular pentagon with a side whose length is \(x + 4\)?

1) \(x^2 + 16\)
2) \(4x + 16\)
3) \(5x + 4\)
4) \(5x + 20\)

329 The diagram below shows right triangle \(ABC\).

Which ratio represents the tangent of \(\angle ABC\)?

1) \(\frac{5}{13}\)
2) \(\frac{5}{12}\)
3) \(\frac{12}{13}\)
4) \(\frac{12}{5}\)

330 The diagram below shows the graph of \(y = -x^2 - c\).

Which diagram shows the graph of \(y = x^2 - c\)?

1)
2)
3)
4)

331 An example of an algebraic expression is

1) \(y = mx + b\)
2) \(3x + 4y - 7\)
3) \(2x + 3y \leq 18\)
4) \((x + y)(x - y) = 25\)
332 Which equation represents a line parallel to the $y$-axis?
1) $y = x$
2) $y = 3$
3) $x = -y$
4) $x = -4$

333 Which expression represents $36x^2 - 100y^6$ factored completely?
1) $2(9x + 25y^3)(9x - 25y^3)$
2) $4(3x + 5y^3)(3x - 5y^3)$
3) $(6x + 10y^3)(6x - 10y^3)$
4) $(18x + 50y^3)(18x - 50y^3)$

334 What is the relationship between the independent and dependent variables in the scatter plot shown below?

1) undefined correlation
2) negative correlation
3) positive correlation
4) no correlation

335 The dimensions of a rectangle are measured to be 12.2 inches by 11.8 inches. The actual dimensions are 12.3 inches by 11.9 inches. What is the relative error, to the nearest ten-thousandth, in calculating the area of the rectangle?
1) 0.0168
2) 0.0167
3) 0.0165
4) 0.0164

336 An 8-foot rope is tied from the top of a pole to a stake in the ground, as shown in the diagram below.

If the rope forms a $57^\circ$ angle with the ground, what is the height of the pole, to the nearest tenth of a foot?
1) 4.4
2) 6.7
3) 9.5
4) 12.3

337 What is the value of $x$ in the equation $2(x - 4) = 4(2x + 1)$?
1) $-2$
2) $2$
3) $-\frac{1}{2}$
4) $\frac{1}{2}$
The school store did a study comparing the cost of a sweatshirt with the number of sweatshirts sold. The price was changed several times and the numbers of sweatshirts sold were recorded. The data are shown in the table below.

<table>
<thead>
<tr>
<th>Cost of Sweatshirt (in dollars)</th>
<th>$10</th>
<th>$25</th>
<th>$15</th>
<th>$20</th>
<th>$5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number Sold</td>
<td>9</td>
<td>6</td>
<td>15</td>
<td>11</td>
<td>14</td>
</tr>
</tbody>
</table>

Which scatter plot represents the data?

1) [Graph A]
2) [Graph B]
3) [Graph C]
4) [Graph D]

The expression \( \frac{(10w^3)^2}{5w} \) is equivalent to
1) \( 2w^5 \)
2) \( 2w^8 \)
3) \( 20w^5 \)
4) \( 20w^8 \)

Julia went to the movies and bought one jumbo popcorn and two chocolate chip cookies for $5.00. Marvin went to the same movie and bought one jumbo popcorn and four chocolate chip cookies for $6.00. How much does one chocolate chip cookie cost?
1) $0.50
2) $0.75
3) $1.00
4) $2.00

In interval notation, the set of all real numbers greater than \(-6\) and less than or equal to 14 is represented by
1) \((-6, 14)\)
2) \([-6, 14)\)
3) \((-6, 14]\)
4) \([-6, 14]\)

Given: \(A = \{3, 6, 9, 12, 15\}\) \(B = \{2, 4, 6, 8, 10, 12\}\) What is the union of sets \(A\) and \(B\)?
1) \{6\}
2) \{6, 12\}
3) \{2, 3, 4, 8, 9, 10, 15\}
4) \{2, 3, 4, 6, 8, 9, 10, 12, 15\}
343 Which equation shows a correct trigonometric ratio for angle $A$ in the right triangle below?

1) $\sin A = \frac{15}{17}$
2) $\tan A = \frac{8}{17}$
3) $\cos A = \frac{15}{17}$
4) $\tan A = \frac{5}{8}$

344 How many different four-letter arrangements are possible with the letters $G, A, R, D, E, N$ if each letter may be used only once?

1) 15
2) 24
3) 360
4) 720

345 What is the quotient of $\frac{x}{x + 4}$ divided by $\frac{2x}{x^2 - 16}$?

1) $\frac{2}{x - 4}$
2) $\frac{2x^2}{x - 4}$
3) $\frac{2x^2}{x^2 - 16}$
4) $\frac{x - 4}{2}$

346 The graphs of the equations $y = 2x - 7$ and $y = kx$ are parallel when $k$ equals $k$.

1) $-2$
2) $2$
3) $-7$
4) $7$

347 What are the vertex and the axis of symmetry of the parabola shown in the graph below?

1) vertex: $(1, 6)$; axis of symmetry: $y = 1$
2) vertex: $(1, 6)$; axis of symmetry: $x = 1$
3) vertex: $(6, 1)$; axis of symmetry: $y = 1$
4) vertex: $(6, 1)$; axis of symmetry: $x = 1$

348 The algebraic expression $\frac{x - 2}{x^2 - 9}$ is undefined when $x$ is

1) 0
2) 2
3) 3
4) 9
349 Which linear equation represents a line containing the point (1,3)?
1) $x + 2y = 5$
2) $x - 2y = 5$
3) $2x + y = 5$
4) $2x - y = 5$

350 What are the roots of the equation $x^2 - 5x + 6 = 0$?
1) 1 and -6
2) 2 and 3
3) -1 and 6
4) -2 and -3

351 The height, $y$, of a ball tossed into the air can be represented by the equation $y = -x^2 + 10x + 3$, where $x$ is the elapsed time. What is the equation of the axis of symmetry of this parabola?
1) $y = 5$
2) $y = -5$
3) $x = 5$
4) $x = -5$

352 Which set of ordered pairs represents a function?
1) $\{(0,4),(2,4),(2,5)\}$
2) $\{(6,0),(5,0),(4,0)\}$
3) $\{(4,1),(6,2),(6,3),(5,0)\}$
4) $\{(0,4),(1,4),(0,5),(1,5)\}$

353 A cylinder has a diameter of 10 inches and a height of 2.3 inches. What is the volume of this cylinder, to the nearest tenth of a cubic inch?
1) 72.3
2) 83.1
3) 180.6
4) 722.6

354 Which ordered pair is in the solution set of the system of linear inequalities graphed below?

![Graph of linear inequalities](image-url)
355 For which set of values of \(x\) is the algebraic expression \(\frac{x^2 - 16}{x^2 - 4x - 12}\) undefined?
1) \{-6, 2\}
2) \{-4, 3\}
3) \{-4, 4\}
4) \{-2, 6\}

356 What is the value of the expression \(-3x^2y + 4x\) when \(x = -4\) and \(y = 2\)?
1) \(-112\)
2) \(-80\)
3) \(80\)
4) \(272\)

357 The data in the table below are graphed, and the slope is examined.

<table>
<thead>
<tr>
<th>(x)</th>
<th>(y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>9.0</td>
</tr>
<tr>
<td>1</td>
<td>8.75</td>
</tr>
<tr>
<td>1.5</td>
<td>8.5</td>
</tr>
<tr>
<td>2</td>
<td>8.25</td>
</tr>
<tr>
<td>2.5</td>
<td>8.0</td>
</tr>
</tbody>
</table>

The rate of change represented in this table can be described as
1) negative
2) positive
3) undefined
4) zero

358 What is the value of the \(y\)-coordinate of the solution to the system of equations \(2x + y = 8\) and \(x - 3y = -3\)?
1) \(-2\)
2) \(2\)
3) \(3\)
4) \(-3\)

359 Which expression is equivalent to \(-3x(x - 4) - 2x(x + 3)\)?
1) \(-x^2 - 1\)
2) \(-x^2 + 18x\)
3) \(-5x^2 - 6x\)
4) \(-5x^2 + 6x\)

360 Which interval notation represents the set of all numbers greater than or equal to 5 and less than 12?
1) \([5, 12]\)
2) \((5, 12]\)
3) \((5, 12)\)
4) \([5, 12)\)

361 The ages of three brothers are consecutive even integers. Three times the age of the youngest brother exceeds the oldest brother's age by 48 years. What is the age of the youngest brother?
1) 14
2) 18
3) 22
4) 26
362. To calculate the volume of a small wooden cube, Ezra measured an edge of the cube as 2 cm. The actual length of the edge of Ezra’s cube is 2.1 cm. What is the relative error in his volume calculation to the nearest hundredth?

1) 0.13
2) 0.14
3) 0.15
4) 0.16

363. Mrs. Ayer is painting the outside of her son’s toy box, including the top and bottom. The toy box measures 3 feet long, 1.5 feet wide, and 2 feet high. What is the total surface area she will paint?

1) 9.0 ft²
2) 13.5 ft²
3) 22.5 ft²
4) 27.0 ft²

364. Which value of \(x\) is in the solution set of the inequality \(-2x + 5 > 17\)?

1) –8
2) –6
3) –4
4) 12

365. Which interval notation represents the set of all numbers from 2 through 7, inclusive?

1) (2, 7]
2) (2, 7)
3) [2, 7)
4) [2, 7]

366. What is the slope of the line that passes through the points (–6, 1) and (4, –4)?

1) \(-2\)
2) \(2\)
3) \(-\frac{1}{2}\)
4) \(\frac{1}{2}\)

367. What is half of \(2^6\)?

1) \(1^3\)
2) \(1^6\)
3) \(2^3\)
4) \(2^5\)

368. If the speed of sound is 344 meters per second, what is the approximate speed of sound, in meters per hour?

\[
\text{Speed in meters per hour} = 344 \times 60 \times 60 = 1,238,400
\]
369 The data set 5, 6, 7, 8, 9, 9, 10, 12, 14, 17, 17, 18, 19, 19 represents the number of hours spent on the Internet in a week by students in a mathematics class. Which box-and-whisker plot represents the data?

1) 

2) 

3) 

4)

370 Lenny made a cube in technology class. Each edge measured 1.5 cm. What is the volume of the cube in cubic centimeters?

1) 2.25
2) 3.375
3) 9.0
4) 13.5

371 Which equation represents a line that is parallel to the line \( y = 3 - 2x \)?

1) \( 4x + 2y = 5 \)
2) \( 2x + 4y = 1 \)
3) \( y = 3 - 4x \)
4) \( y = 4x - 2 \)

372 Which graph represents the solution of \( 3y - 9 \leq 6x \)?

1) 

2) 

3) 

4)
373 Which ordered pair is a solution of the system of equations \(y = x^2 - x - 20\) and \(y = 3x - 15\)?
1) \((-5, -30)\)
2) \((-1, -18)\)
3) \((0, 5)\)
4) \((5, -1)\)

374 Which value of \(x\) is the solution of \(\frac{2x}{5} + \frac{1}{3} = \frac{7x - 2}{15}\)?
1) \(\frac{3}{5}\)
2) \(\frac{31}{26}\)
3) \(3\)
4) \(7\)

375 The local ice cream stand offers three flavors of soft-serve ice cream: vanilla, chocolate, and strawberry; two types of cone: sugar and wafer; and three toppings: sprinkles, nuts, and cookie crumbs. If Dawn does not order vanilla ice cream, how many different choices can she make that have one flavor of ice cream, one type of cone, and one topping?
1) 7
2) 8
3) 12
4) 18

376 Consider the set of integers greater than \(-2\) and less than 6. A subset of this set is the positive factors of 5. What is the complement of this subset?
1) \(\{0, 2, 3, 4\}\)
2) \(\{-1, 0, 2, 3, 4\}\)
3) \(\{-2, -1, 0, 2, 3, 4, 6\}\)
4) \(\{-2, -1, 0, 1, 2, 3, 4, 5, 6\}\)

377 The spinner below is divided into eight equal regions and is spun once. What is the probability of not getting red?

![Spinner](image)
1) \(\frac{3}{5}\)
2) \(\frac{3}{8}\)
3) \(\frac{5}{8}\)
4) \(\frac{7}{8}\)

378 If \(3ax + b = c\), then \(x\) equals
1) \(c - b + 3a\)
2) \(c + b - 3a\)
3) \(\frac{c - b}{3a}\)
4) \(\frac{b - c}{3a}\)

379 Tamara has a cell phone plan that charges \$0.07 per minute plus a monthly fee of \$19.00. She budgets \$29.50 per month for total cell phone expenses without taxes. What is the maximum number of minutes Tamara could use her phone each month in order to stay within her budget?
1) 150
2) 271
3) 421
4) 692
380 Pam is playing with red and black marbles. The number of red marbles she has is three more than twice the number of black marbles she has. She has 42 marbles in all. How many red marbles does Pam have?

1) 13  
2) 15  
3) 29  
4) 33

381 The expression \( \frac{9x^4 - 27x^6}{3x^3} \) is equivalent to

1) \(3x(1 - 3x)\)  
2) \(3x(1 - 3x^2)\)  
3) \(3x(1 - 9x^5)\)  
4) \(9x^3(1 - x)\)

382 What are the vertex and axis of symmetry of the parabola \( y = x^2 - 16x + 63 \)?

1) vertex: \((8, -1)\); axis of symmetry: \(x = 8\)  
2) vertex: \((8, 1)\); axis of symmetry: \(x = 8\)  
3) vertex: \((-8, -1)\); axis of symmetry: \(x = -8\)  
4) vertex: \((-8, 1)\); axis of symmetry: \(x = -8\)

383 Which expression represents \((3x^2y^4)(4xy^5)\) in simplest form?

1) \(12x^3y^8\)  
2) \(12x^2y^6\)  
3) \(12x^3y^8\)  
4) \(12x^3y^6\)

384 Which graph represents a function?

1)  
2)  
3)  
4)  

385 Which expression represents \(\frac{(2x^3)(8x^5)}{4x^6}\) in simplest form?

1) \(x^2\)  
2) \(x^9\)  
3) \(4x^2\)  
4) \(4x^9\)
386 Which graph represents a linear function?

1)

2)

3)

4)

387 Consider the graph of the equation \( y = ax^2 + bx + c \), when \( a \neq 0 \). If \( a \) is multiplied by 3, what is true of the graph of the resulting parabola?
1) The vertex is 3 units above the vertex of the original parabola.
2) The new parabola is 3 units to the right of the original parabola.
3) The new parabola is wider than the original parabola.
4) The new parabola is narrower than the original parabola.

388 Jack bought 3 slices of cheese pizza and 4 slices of mushroom pizza for a total cost of $12.50. Grace bought 3 slices of cheese pizza and 2 slices of mushroom pizza for a total cost of $8.50. What is the cost of one slice of mushroom pizza?
1) $1.50
2) $2.00
3) $3.00
4) $3.50

389 What is the speed, in meters per second, of a paper airplane that flies 24 meters in 6 seconds?
1) 144
2) 30
3) 18
4) 4

390 Carrie bought new carpet for her living room. She calculated the area of the living room to be 174.2 square feet. The actual area was 149.6 square feet. What is the relative error of the area to the nearest ten-thousandth?
1) 0.1412
2) 0.1644
3) 1.8588
4) 2.1644
391 Luis is going to paint a basketball court on his driveway, as shown in the diagram below. This basketball court consists of a rectangle and a semicircle.

Which expression represents the area of this basketball court, in square feet?
1) 80
2) 80 + 8π
3) 80 + 16π
4) 80 + 64π

392 What is \(\frac{\sqrt{32}}{4}\) expressed in simplest radical form?
1) \(\sqrt{2}\)
2) \(4\sqrt{2}\)
3) \(\sqrt{8}\)
4) \(\frac{\sqrt{8}}{2}\)

393 What is an equation of the line that passes through the points (3, -3) and (-3, -3)?
1) \(y = 3\)
2) \(x = -3\)
3) \(y = -3\)
4) \(x = y\)

394 In triangle \(MCT\), the measure of \(\angle T = 90^\circ\), \(MC = 85\) cm, \(CT = 84\) cm, and \(TM = 13\) cm. Which ratio represents the sine of \(\angle C\)?
1) \(\frac{13}{85}\)
2) \(\frac{84}{85}\)
3) \(\frac{13}{84}\)
4) \(\frac{84}{13}\)

395 What are the vertex and the axis of symmetry of the parabola shown in the diagram below?

1) The vertex is \((-2, -3)\), and the axis of symmetry is \(x = -2\).
2) The vertex is \((-2, -3)\), and the axis of symmetry is \(y = -2\).
3) The vertex is \((-3, -2)\), and the axis of symmetry is \(y = -2\).
4) The vertex is \((-3, -2)\), and the axis of symmetry is \(x = -2\).
396 What is the value of the y-coordinate of the solution to the system of equations \( x - 2y = 1 \) and \( x + 4y = 7? \)
1) 1
2) -1
3) 3
4) 4

397 Keisha is playing a game using a wheel divided into eight equal sectors, as shown in the diagram below. Each time the spinner lands on orange, she will win a prize.

If Keisha spins this wheel twice, what is the probability she will win a prize on both spins?
1) \( \frac{1}{64} \)
2) \( \frac{1}{56} \)
3) \( \frac{1}{16} \)
4) \( \frac{1}{4} \)

398 Given:
\[ A = \{ \text{All even integers from 2 to 20, inclusive} \} \]
\[ B = \{10, 12, 14, 16, 18\} \]
What is the complement of set \( B \) within the universe of set \( A \)?
1) \{4, 6, 8\}
2) \{2, 4, 6, 8\}
3) \{4, 6, 8, 20\}
4) \{2, 4, 6, 8, 20\}

399 Which data set describes a situation that could be classified as qualitative?
1) the ages of the students in Ms. Marshall’s Spanish class
2) the test scores of the students in Ms. Fitzgerald’s class
3) the favorite ice cream flavor of each of Mr. Hayden’s students
4) the heights of the players on the East High School basketball team

400 What is the value of the expression \(|-5x + 12|\) when \( x = 5? \)
1) -37
2) -13
3) 13
4) 37

401 The function \( y = \frac{x}{x^2 - 9} \) is undefined when the value of \( x \) is
1) 0 or 3
2) 3 or -3
3) 3, only
4) -3, only
402 Which inequality is represented by the graph below?

1) \( y < 2x + 1 \)
2) \( y < -2x + 1 \)
3) \( y < \frac{1}{2}x + 1 \)
4) \( y < -\frac{1}{2}x + 1 \)

403 Which expression represents \( \frac{2x^2 - 12x}{x - 6} \) in simplest form?

1) 0
2) \( 2x \)
3) \( 4x \)
4) \( 2x + 2 \)

404 Tanya runs diagonally across a rectangular field that has a length of 40 yards and a width of 30 yards, as shown in the diagram below.

What is the length of the diagonal, in yards, that Tanya runs?

1) 50
2) 60
3) 70
4) 80

405 What is \( \sqrt{32} \) expressed in simplest radical form?

1) \( 16\sqrt{2} \)
2) \( 4\sqrt{2} \)
3) \( 4\sqrt{8} \)
4) \( 2\sqrt{8} \)

406 It takes Tammy 45 minutes to ride her bike 5 miles. At this rate, how long will it take her to ride 8 miles?

1) 0.89 hour
2) 1.125 hours
3) 48 minutes
4) 72 minutes
407 Which expression is equivalent to $9x^2 - 16$?
1) $(3x + 4)(3x - 4)$
2) $(3x - 4)(3x - 4)$
3) $(3x + 8)(3x - 8)$
4) $(3x - 8)(3x - 8)$

408 Which equation represents a line parallel to the $x$-axis?
1) $y = -5$
2) $y = -5x$
3) $x = 3$
4) $x = 3y$

409 What is the product of $-3x^2y$ and $(5xy^2 + xy)$?
1) $-15x^3y^3 - 3x^3y^2$
2) $-15x^3y^3 - 3x^3y$
3) $-15x^2y^2 - 3x^2y$
4) $-15x^3y^3 + xy$

410 The New York Volleyball Association invited 64 teams to compete in a tournament. After each round, half of the teams were eliminated. Which equation represents the number of teams, $t$, that remained in the tournament after $r$ rounds?
1) $t = 64(r)^{0.5}$
2) $t = 64(-0.5)^r$
3) $t = 64(1.5)^r$
4) $t = 64(0.5)^r$

411 What is the value of the third quartile shown on the box-and-whisker plot below?
1) 6
2) 8.5
3) 10
4) 12

412 The expression $9x^2 - 100$ is equivalent to
1) $(9x - 10)(x + 10)$
2) $(3x - 10)(3x + 10)$
3) $(3x - 100)(3x - 1)$
4) $(9x - 100)(x + 1)$

413 What is the sum of $\frac{3}{2x}$ and $\frac{4}{3x}$ expressed in simplest form?
1) $\frac{12}{6x^2}$
2) $\frac{17}{6x}$
3) $\frac{7}{5x}$
4) $\frac{17}{12x}$
414 The number of hours spent on math homework each week and the final exam grades for twelve students in Mr. Dylan's algebra class are plotted below.

Based on a line of best fit, which exam grade is the best prediction for a student who spends about 4 hours on math homework each week?

1) 62
2) 72
3) 82
4) 92

415 Which situation should be analyzed using bivariate data?

1) Ms. Saleem keeps a list of the amount of time her daughter spends on her social studies homework.
2) Mr. Benjamin tries to see if his students’ shoe sizes are directly related to their heights.
3) Mr. DeStefan records his customers’ best video game scores during the summer.
4) Mr. Chan keeps track of his daughter’s algebra grades for the quarter.

416 Which value of \( p \) is the solution of \( 5p - 1 = 2p + 20 \)?

1) \( \frac{19}{7} \)
2) \( \frac{19}{3} \)
3) 3
4) 7

417 What is the product of \( 8.4 \times 10^8 \) and \( 4.2 \times 10^3 \) written in scientific notation?

1) \( 2.0 \times 10^5 \)
2) \( 12.6 \times 10^{11} \)
3) \( 35.28 \times 10^{11} \)
4) \( 3.528 \times 10^{12} \)

418 A tree casts a 25-foot shadow on a sunny day, as shown in the diagram below.

If the angle of elevation from the tip of the shadow to the top of the tree is 32°, what is the height of the tree to the nearest tenth of a foot?

1) 13.2
2) 15.6
3) 21.2
4) 40.0
419  For 10 days, Romero kept a record of the number of hours he spent listening to music. The information is shown in the table below.

<table>
<thead>
<tr>
<th>Day</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours</td>
<td>9</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>8</td>
<td>6</td>
<td>10</td>
<td>4</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

Which scatter plot shows Romero’s data graphically?

1)  
2)  
3)  
4)  

420  Throughout history, many people have contributed to the development of mathematics. These mathematicians include Pythagoras, Euclid, Hypatia, Euler, Einstein, Agnesi, Fibonacci, and Pascal. What is the probability that a mathematician’s name selected at random from those listed will start with either the letter \(E\) or the letter \(A\)?

1) \(\frac{2}{8}\)  
2) \(\frac{3}{8}\)  
3) \(\frac{4}{8}\)  
4) \(\frac{6}{8}\)

421  When \(3g^2 - 4g + 2\) is subtracted from \(7g^2 + 5g - 1\), the difference is

1) \(-4g^2 - 9g + 3\)  
2) \(4g^2 + g + 1\)  
3) \(4g^2 + 9g - 3\)  
4) \(10g^2 + g + 1\)

422  Which value of \(x\) makes the expression \(\frac{x^2 - 9}{x^2 + 7x + 10}\) undefined?

1) \(-5\)  
2) \(2\)  
3) \(3\)  
4) \(-3\)
423 There is a negative correlation between the number of hours a student watches television and his or her social studies test score. Which scatter plot below displays this correlation?

1)  
2)  
3)  
4)  

424 What is the additive inverse of the expression \( a - b \)?
1) \( a + b \)
2) \( a - b \)
3) \(-a + b\)
4) \(-a - b\)

425 Which value of \( n \) makes the expression \( \frac{5n}{2n - 1} \) undefined?
1) 1
2) 0
3) \(-\frac{1}{2}\)
4) \(\frac{1}{2}\)

426 Which verbal expression represents \( 2(n - 6) \)?
1) two times \( n \) minus six
2) two times six minus \( n \)
3) two times the quantity \( n \) less than six
4) two times the quantity six less than \( n \)

427 Which ordered pair is in the solution set of the system of equations \( y = -x + 1 \) and \( y = x^2 + 5x + 6 \)?
1) \((-5, -1)\)
2) \((-5, 6)\)
3) \((5, -4)\)
4) \((5, 2)\)

428 What is \( \sqrt{72} \) expressed in simplest radical form?
1) \(2\sqrt{18}\)
2) \(3\sqrt{8}\)
3) \(6\sqrt{2}\)
4) \(8\sqrt{3}\)
429 In the right triangle shown in the diagram below, what is the value of $x$ to the nearest whole number?

1) 12
2) 14
3) 21
4) 28

430 Which type of graph is shown in the diagram below?

1) absolute value
2) exponential
3) linear
4) quadratic

431 The gas tank in a car holds a total of 16 gallons of gas. The car travels 75 miles on 4 gallons of gas. If the gas tank is full at the beginning of a trip, which graph represents the rate of change in the amount of gas in the tank?
432 Which statement is true about the relation shown on the graph below?

1) It is a function because there exists one \( x \)-coordinate for each \( y \)-coordinate.
2) It is a function because there exists one \( y \)-coordinate for each \( x \)-coordinate.
3) It is not a function because there are multiple \( y \)-values for a given \( x \)-value.
4) It is not a function because there are multiple \( x \)-values for a given \( y \)-value.

433 Nancy’s rectangular garden is represented in the diagram below.

If a diagonal walkway crosses her garden, what is its length, in feet?

1) 17
2) 22
3) \( \sqrt{161} \)
4) \( \sqrt{529} \)

434 What is an equation of the line that passes through the point \((4, -6)\) and has a slope of \(-3\)?

1) \( y = -3x + 6 \)
2) \( y = -3x - 6 \)
3) \( y = -3x + 10 \)
4) \( y = -3x + 14 \)

435 Rhonda has $1.35 in nickels and dimes in her pocket. If she has six more dimes than nickels, which equation can be used to determine \( x \), the number of nickels she has?

1) \( 0.05(x + 6) + 0.10x = 1.35 \)
2) \( 0.05x + 0.10(x + 6) = 1.35 \)
3) \( 0.05 + 0.10(6x) = 1.35 \)
4) \( 0.15(x + 6) = 1.35 \)

436 Which equation is represented by the graph below?

1) \( y = x^2 - 3 \)
2) \( y = (x - 3)^2 \)
3) \( y = |x| - 3 \)
4) \( y = |x - 3| \)
437 Which equation could be used to find the measure of one acute angle in the right triangle shown below?

$$\sin A = \frac{4}{5}$$

$$\tan A = \frac{5}{4}$$

$$\cos B = \frac{5}{4}$$

$$\tan B = \frac{4}{5}$$

438 The expression $x^2 - 16$ is equivalent to

1) $(x + 2)(x - 8)$

2) $(x - 2)(x + 8)$

3) $(x + 4)(x - 4)$

4) $(x + 8)(x - 8)$

439 Which data set describes a situation that could be classified as qualitative?

1) the elevations of the five highest mountains in the world

2) the ages of presidents at the time of their inauguration

3) the opinions of students regarding school lunches

4) the shoe sizes of players on the basketball team

440 The equation $y = x^2 + 3x - 18$ is graphed on the set of axes below.

Based on this graph, what are the roots of the equation $x^2 + 3x - 18 = 0$?

1) $-3$ and $6$

2) $0$ and $-18$

3) $3$ and $-6$

4) $3$ and $-18$

441 Which value of $x$ makes the expression $\frac{x + 4}{x - 3}$ undefined?

1) $-4$

2) $-3$

3) $3$

4) $0$

442 What is the solution of $\frac{k + 4}{2} = \frac{k + 9}{3}$?

1) $1$

2) $5$

3) $6$

4) $14$
443 A spinner is divided into eight equal regions as shown in the diagram below.

Which event is most likely to occur in one spin?
1) The arrow will land in a green or white area.
2) The arrow will land in a green or black area.
3) The arrow will land in a yellow or black area.
4) The arrow will land in a yellow or green area.

444 The table below shows a cumulative frequency distribution of runners' ages.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>20–29</td>
<td>8</td>
</tr>
<tr>
<td>20–39</td>
<td>18</td>
</tr>
<tr>
<td>20–49</td>
<td>25</td>
</tr>
<tr>
<td>20–59</td>
<td>31</td>
</tr>
<tr>
<td>20–69</td>
<td>35</td>
</tr>
</tbody>
</table>

According to the table, how many runners are in their forties?
1) 25
2) 10
3) 7
4) 6

445 What is $\frac{6}{4a} - \frac{2}{3a}$ expressed in simplest form?
1) $\frac{4}{a}$
2) $\frac{5}{6a}$
3) $\frac{8}{7a}$
4) $\frac{10}{12a}$

446 Which expression represents $\frac{27x^{18}y^5}{9x^5y}$ in simplest form?
1) $3x^{12}y^4$
2) $3x^3y^5$
3) $18x^{12}y^4$
4) $18x^3y^5$

447 When $5\sqrt{20}$ is written in simplest radical form, the result is $k\sqrt{5}$. What is the value of $k$?
1) 20
2) 10
3) 7
4) 4

448 Factored, the expression $16x^2 - 25y^2$ is equivalent to
1) $(4x - 5y)(4x + 5y)$
2) $(4x - 5y)(4x - 5y)$
3) $(8x - 5y)(8x + 5y)$
4) $(8x - 5y)(8x - 5y)$
449 Kathy plans to purchase a car that depreciates (loses value) at a rate of 14% per year. The initial cost of the car is $21,000. Which equation represents the value, \(v\), of the car after 3 years?

1) \(v = 21,000(0.14)^3\)
2) \(v = 21,000(0.86)^3\)
3) \(v = 21,000(1.14)^3\)
4) \(v = 21,000(0.86)(3)\)

450 The faces of a cube are numbered from 1 to 6. If the cube is rolled once, which outcome is least likely to occur?

1) rolling an odd number
2) rolling an even number
3) rolling a number less than 6
4) rolling a number greater than 4

451 Which statement is true about the data set 3, 4, 5, 6, 7, 7, 10?

1) mean = mode
2) mean > mode
3) mean = median
4) mean < median

452 Which value of \(x\) is in the solution set of the inequality \(-4x + 2 > 10\)?

1) -2
2) 2
3) 3
4) -4

453 The solution to the equation \(x^2 - 6x = 0\) is

1) 0, only
2) 6, only
3) 0 and 6
4) \(\pm \sqrt{6}\)

454 Students in Ms. Nazzeer's mathematics class tossed a six-sided number cube whose faces are numbered 1 to 6. The results are recorded in the table below.

<table>
<thead>
<tr>
<th>Result</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Based on these data, what is the empirical probability of tossing a 4?

1) \(\frac{8}{30}\)
2) \(\frac{6}{30}\)
3) \(\frac{5}{30}\)
4) \(\frac{1}{30}\)

455 What is the value of the \(y\)-coordinate of the solution to the system of equations \(x + 2y = 9\) and \(x - y = 3\)?

1) 6
2) 2
3) 3
4) 5
456. What is the product of \( \frac{4x}{x-1} \) and \( \frac{x^2-1}{3x+3} \) expressed in simplest form?
1) \( \frac{4x}{3} \)
2) \( \frac{4x^2}{3} \)
3) \( \frac{4x^2}{3(x+1)} \)
4) \( \frac{4(x+1)}{3} \)

457. Cassandra bought an antique dresser for $500. If the value of her dresser increases 6% annually, what will be the value of Cassandra's dresser at the end of 3 years to the nearest dollar?
1) $415
2) $590
3) $596
4) $770

458. Which ordered pair is in the solution set of the following system of inequalities?
\[
\begin{align*}
y &< \frac{1}{2}x + 4 \\
y &\geq -x + 1
\end{align*}
\]
1) \((-5, 3)\)
2) \((0, 4)\)
3) \((3, -5)\)
4) \((4, 0)\)

459. What are the roots of the equation \( x^2 - 7x + 6 = 0 \)?
1) 1 and 7
2) \(-1\) and 7
3) \(-1\) and \(-6\)
4) 1 and 6

460. A swim team member performs a dive from a 14-foot-high springboard. The parabola below shows the path of her dive.

Which equation represents the axis of symmetry?
1) \( x = 3 \)
2) \( y = 3 \)
3) \( x = 23 \)
4) \( y = 23 \)

461. The length of a rectangular room is 7 less than three times the width, \( w \), of the room. Which expression represents the area of the room?
1) \( 3w - 4 \)
2) \( 3w - 7 \)
3) \( 3w^2 - 4w \)
4) \( 3w^2 - 7w \)

462. The sum of two numbers is 47, and their difference is 15. What is the larger number?
1) 16
2) 31
3) 32
4) 36
463 Erica is conducting a survey about the proposed increase in the sports budget in the Hometown School District. Which survey method would likely contain the most bias?

1) Erica asks every third person entering the Hometown Grocery Store.
2) Erica asks every third person leaving the Hometown Shopping Mall this weekend.
3) Erica asks every fifth student entering Hometown High School on Monday morning.
4) Erica asks every fifth person leaving Saturday’s Hometown High School football game.

464 Mrs. Smith wrote "Eight less than three times a number is greater than fifteen" on the board. If $x$ represents the number, which inequality is a correct translation of this statement?

1) $3x - 8 > 15$
2) $3x - 8 < 15$
3) $8 - 3x > 15$
4) $8 - 3x < 15$

465 The set \{1, 2, 3, 4\} is equivalent to

1) \{x | 1 < x < 4, where x is a whole number\}
2) \{x | 0 < x < 4, where x is a whole number\}
3) \{x | 0 < x ≤ 4, where x is a whole number\}
4) \{x | 1 < x ≤ 4, where x is a whole number\}

466 Daniel’s Print Shop purchased a new printer for $35,000. Each year it depreciates (loses value) at a rate of 5%. What will its approximate value be at the end of the fourth year?

1) $33,250.00$
2) $30,008.13$
3) $28,507.72$
4) $27,082.33$

467 Which equation most closely represents the line of best fit for the scatter plot below?

1) $y = x$
2) $y = \frac{2}{3}x + 1$
3) $y = \frac{3}{2}x + 4$
4) $y = \frac{3}{2}x + 1$

468 Marie currently has a collection of 58 stamps. If she buys $s$ stamps each week for $w$ weeks, which expression represents the total number of stamps she will have?

1) $58sw$
2) $58 + sw$
3) $58s + w$
4) $58 + s + w$
469 What is the slope of the line that passes through the points \((-5, 4)\) and \((15, -4)\)?
1) \(-\frac{2}{5}\)
2) 0
3) \(-\frac{5}{2}\)
4) undefined

470 For which value of \(x\) is \(\frac{x - 3}{x^2 - 4}\) undefined?
1) \(-2\)
2) 0
3) 3
4) 4

471 Which ordered pair is a solution to the system of equations \(y = x\) and \(y = x^2 - 2\)?
1) \((-2, -2)\)
2) \((-1, 1)\)
3) \((0, 0)\)
4) \((2, 2)\)

472 What is the quotient of \(8.05 \times 10^6\) and \(3.5 \times 10^2\)?
1) \(2.3 \times 10^3\)
2) \(2.3 \times 10^4\)
3) \(2.3 \times 10^8\)
4) \(2.3 \times 10^{12}\)

473 Nicole’s aerobics class exercises to fast-paced music. If the rate of the music is 120 beats per minute, how many beats would there be in a class that is 0.75 hour long?
1) 90
2) 160
3) 5,400
4) 7,200

474 A cylindrical container has a diameter of 12 inches and a height of 15 inches, as illustrated in the diagram below.

What is the volume of this container to the nearest tenth of a cubic inch?
1) 6,785.8
2) 4,241.2
3) 2,160.0
4) 1,696.5

475 In a linear equation, the independent variable increases at a constant rate while the dependent variable decreases at a constant rate. The slope of this line is
1) zero
2) negative
3) positive
4) undefined
476 Which equation represents a line that is parallel to the line $y = -4x + 5$?

1) $y = -4x + 3$
2) $y = rac{1}{4}x + 5$
3) $y = rac{1}{4}x + 3$
4) $y = 4x + 5$

477 A playground in a local community consists of a rectangle and two semicircles, as shown in the diagram below.

Which expression represents the amount of fencing, in yards, that would be needed to completely enclose the playground?

1) $15\pi + 50$
2) $15\pi + 80$
3) $30\pi + 50$
4) $30\pi + 80$

478 If $a + ar = b + r$, the value of $a$ in terms of $b$ and $r$ can be expressed as

1) $\frac{b}{r} + 1$
2) $\frac{1 + b}{r}$
3) $\frac{b + r}{1 + r}$
4) $\frac{1 + b}{r + b}$

479 The sign shown below is posted in front of a roller coaster ride at the Wadsworth County Fairgrounds.

If $h$ represents the height of a rider in inches, what is a correct translation of the statement on this sign?

1) $h < 48$
2) $h > 48$
3) $h \leq 48$
4) $h \geq 48$

480 Which value of $x$ is in the solution set of $\frac{4}{3}x + 5 < 17$?

1) 8
2) 9
3) 12
4) 16

481 What are the roots of the equation $x^2 - 10x + 21 = 0$?

1) 1 and 21
2) -5 and -5
3) 3 and 7
4) -3 and -7
482 The diagram below shows the graph of \( y = |x - 3| \). Which diagram shows the graph of \( y = -|x - 3| \)?

483 If \( h \) represents a number, which equation is a correct translation of "Sixty more than 9 times a number is 375"?

1) \( 9h = 375 \)
2) \( 9h + 60 = 375 \)
3) \( 9h - 60 = 375 \)
4) \( 60h + 9 = 375 \)

484 Which value of \( x \) is the solution of the equation \( \frac{2x}{3} + \frac{x}{6} = 5 \)?

1) 6
2) 10
3) 15
4) 30

485 What is the product of \( \frac{x^2 - 1}{x + 1} \) and \( \frac{x + 3}{3x - 3} \) expressed in simplest form?

1) \( x \)
2) \( -\frac{x}{3} \)
3) \( x + 3 \)
4) \( \frac{x + 3}{3} \)

486 Which expression represents \( \frac{25x - 125}{x^2 - 25} \) in simplest form?

1) \( \frac{5}{x} \)
2) \( -\frac{5}{x} \)
3) \( \frac{25}{x - 5} \)
4) \( \frac{25}{x + 5} \)
487 The equations $5x + 2y = 48$ and $3x + 2y = 32$ represent the money collected from school concert ticket sales during two class periods. If $x$ represents the cost for each adult ticket and $y$ represents the cost for each student ticket, what is the cost for each adult ticket?
1) $20$
2) $10$
3) $8$
4) $4$

488 On a certain day in Toronto, Canada, the temperature was $15\degree$ Celsius ($C$). Using the formula $F = \frac{9}{5} C + 32$, Peter converts this temperature to degrees Fahrenheit ($F$). Which temperature represents $15\degree$C in degrees Fahrenheit?
1) $-9$
2) $35$
3) $59$
4) $85$

489 What is $\frac{6}{5x} - \frac{2}{3x}$ in simplest form?
1) $\frac{8}{15x^2}$
2) $\frac{8}{15x}$
3) $\frac{4}{15x}$
4) $\frac{4}{2x}$

490 A survey is being conducted to determine which types of television programs people watch. Which survey and location combination would likely contain the most bias?
1) surveying 10 people who work in a sporting goods store
2) surveying the first 25 people who enter a grocery store
3) randomly surveying 50 people during the day in a mall
4) randomly surveying 75 people during the day in a clothing store

491 The set $\{11, 12\}$ is equivalent to
1) $\{x | 11 < x < 12, \text{ where } x \text{ is an integer}\}$
2) $\{x | 11 < x \leq 12, \text{ where } x \text{ is an integer}\}$
3) $\{x | 10 < x < 12, \text{ where } x \text{ is an integer}\}$
4) $\{x | 10 < x \leq 12, \text{ where } x \text{ is an integer}\}$

492 At Genesee High School, the sophomore class has 60 more students than the freshman class. The junior class has 50 fewer students than twice the students in the freshman class. The senior class is three times as large as the freshman class. If there are a total of 1,424 students at Genesee High School, how many students are in the freshman class?
1) 202
2) 205
3) 235
4) 236

493 Solve for $x$: $\frac{3}{5}(x + 2) = x - 4$
1) 8
2) 13
3) 15
4) 23
494 Students in a ninth grade class measured their heights, $h$, in centimeters. The height of the shortest student was 155 cm, and the height of the tallest student was 190 cm. Which inequality represents the range of heights?
1) $155 < h < 190$
2) $155 \leq h \leq 190$
3) $h \geq 155$ or $h \leq 190$
4) $h > 155$ or $h < 190$

495 John is going to line up his four golf trophies on a shelf in his bedroom. How many different possible arrangements can he make?
1) 24
2) 16
3) 10
4) 4

496 The groundskeeper is replacing the turf on a football field. His measurements of the field are 130 yards by 60 yards. The actual measurements are 120 yards by 54 yards. Which expression represents the relative error in the measurement?
1) \[ \frac{(130)(60) - (120)(54)}{(120)(54)} \]
2) \[ \frac{(130)(60) - (120)(54)}{(120)(54)} \]
3) \[ \frac{(130)(60) - (120)(54)}{(130)(60)} \]
4) \[ \frac{(130)(60)}{(130)(60) - (120)(54)} \]

497 Which property is illustrated by the equation $ax + ay = a(x + y)$?
1) associative
2) commutative
3) distributive
4) identity

498 Which situation describes a correlation that is not a causal relationship?
1) The rooster crows, and the Sun rises.
2) The more miles driven, the more gasoline needed
3) The more powerful the microwave, the faster the food cooks.
4) The faster the pace of a runner, the quicker the runner finishes.

499 The center pole of a tent is 8 feet long, and a side of the tent is 12 feet long as shown in the diagram below.

If a right angle is formed where the center pole meets the ground, what is the measure of angle $A$ to the nearest degree?
1) 34
2) 42
3) 48
4) 56
500 Which relationship can best be described as causal?
1) height and intelligence
2) shoe size and running speed
3) number of correct answers on a test and test score
4) number of students in a class and number of students with brown hair

501 The length of a rectangular window is 5 feet more than its width, \( w \). The area of the window is 36 square feet. Which equation could be used to find the dimensions of the window?
1) \( w^2 + 5w + 36 = 0 \)
2) \( w^2 - 5w - 36 = 0 \)
3) \( w^2 - 5w + 36 = 0 \)
4) \( w^2 + 5w - 36 = 0 \)

502 A rectangle has an area of 24 square units. The width is 5 units less than the length. What is the length, in units, of the rectangle?
1) 6
2) 8
3) 3
4) 19

503 The length of the hypotenuse of a right triangle is 34 inches and the length of one of its legs is 16 inches. What is the length, in inches, of the other leg of this right triangle?
1) 16
2) 18
3) 25
4) 30

504 Antwaan leaves a cup of hot chocolate on the counter in his kitchen. Which graph is the best representation of the change in temperature of his hot chocolate over time?
505 The statement $2 + 0 = 2$ is an example of the use of which property of real numbers?
1) associative
2) additive identity
3) additive inverse
4) distributive

509 What is the value of $x$, in inches, in the right triangle below?

506 Alex earned scores of 60, 74, 82, 87, 87, and 94 on his first six algebra tests. What is the relationship between the measures of central tendency of these scores?
1) median < mode < mean
2) mean < mode < median
3) mode < median < mean
4) mean < median < mode

507 Factored completely, the expression $2x^2 + 10x - 12$ is equivalent to
1) $2(x - 6)(x + 1)$
2) $2(x + 6)(x - 1)$
3) $2(x + 2)(x + 3)$
4) $2(x - 2)(x - 3)$

508 When $4x^2 + 7x - 5$ is subtracted from $9x^2 - 2x + 3$, the result is
1) $5x^2 + 5x - 2$
2) $5x^2 - 9x + 8$
3) $-5x^2 + 5x - 2$
4) $-5x^2 + 9x - 8$

510 Which equation represents a line parallel to the $x$-axis?
1) $x = 5$
2) $y = 10$
3) $x = \frac{1}{3}y$
4) $y = 5x + 17$

511 Given:
Set $A = \{(-2, -1), (-1, 0), (1, 8)\}$
Set $B = \{(-3, -4), (-2, -1), (-1, 2), (1, 8)\}$.
What is the intersection of sets $A$ and $B$?
1) $\{(1, 8)\}$
2) $\{(-2, -1)\}$
3) $\{(-2, -1), (1, 8)\}$
4) $\{(-3, -4), (-2, -1), (-1, 2), (1, 8)\}$
512 The equation \( y = -x^2 - 2x + 8 \) is graphed on the set of axes below.

Based on this graph, what are the roots of the equation \( -x^2 - 2x + 8 = 0 \)?
1) 8 and 0
2) 2 and -4
3) 9 and -1
4) 4 and -2

513 Which expression represents \( \frac{x^2 - 2x - 15}{x^2 + 3x} \) in simplest form?
1) \( \frac{x-5}{x} \)
2) \( \frac{2x - 5}{x} \)
3) \( \frac{2x - 15}{3x} \)
4) \( \frac{-2x - 15}{3x} \)

514 The diagram below shows right triangle \( UPC \).

Which ratio represents the sine of \( \angle U \)?
1) \( \frac{15}{8} \)
2) \( \frac{15}{17} \)
3) \( \frac{8}{15} \)
4) \( \frac{8}{17} \)

515 The bowling team at Lincoln High School must choose a president, vice president, and secretary. If the team has 10 members, which expression could be used to determine the number of ways the officers could be chosen?
1) \( 3P_{10} \)
2) \( 7P_3 \)
3) \( 10P_3 \)
4) \( 10P_7 \)
516 What is the slope of the line containing the points (3, 4) and (−6, 10)?

1) \( \frac{1}{2} \)
2) 2
3) \( -\frac{2}{3} \)
4) \( -\frac{3}{2} \)

517 Don placed a ladder against the side of his house as shown in the diagram below.

Which equation could be used to find the distance, \( x \), from the foot of the ladder to the base of the house?

1) \( x = 20 - 19.5 \)
2) \( x = 20^2 - 19.5^2 \)
3) \( x = \sqrt{20^2 - 19.5^2} \)
4) \( x = \sqrt{20^2 + 19.5^2} \)

518 Which value of \( x \) is in the solution set of the inequality \(-2(x - 5) < 4\)?

1) 0
2) 2
3) 3
4) 5

519 Sam and Odel have been selling frozen pizzas for a class fundraiser. Sam has sold half as many pizzas as Odel. Together they have sold a total of 126 pizzas. How many pizzas did Sam sell?

1) 21
2) 42
3) 63
4) 84

520 A movie theater recorded the number of tickets sold daily for a popular movie during the month of June. The box-and-whisker plot shown below represents the data for the number of tickets sold, in hundreds.

Which conclusion can be made using this plot?

1) The second quartile is 600.
2) The mean of the attendance is 400.
3) The range of the attendance is 300 to 600.
4) Twenty-five percent of the attendance is between 300 and 400.
521 What is the product of 12 and $4.2 \times 10^6$ expressed in scientific notation?
1) $50.4 \times 10^6$
2) $50.4 \times 10^7$
3) $5.04 \times 10^6$
4) $5.04 \times 10^7$

522 The box-and-whisker plot below represents students' scores on a recent English test.

What is the value of the upper quartile?
1) 68
2) 76
3) 84
4) 94

523 Mr. Turner bought $x$ boxes of pencils. Each box holds 25 pencils. He left 3 boxes of pencils at home and took the rest to school. Which expression represents the total number of pencils he took to school?
1) $22x$
2) $25x - 3$
3) $25 - 3x$
4) $25x - 75$

524 Which relation is not a function?
1) $\{(1, 5), (2, 6), (3, 6), (4, 7)\}$
2) $\{(4, 7), (2, 1), (-3, 6), (3, 4)\}$
3) $\{(-1, 6), (1, 3), (2, 5), (1, 7)\}$
4) $\{(-1, 2), (0, 5), (5, 0), (2, -1)\}$

525 Which graph represents a function?

526 Which expression is equivalent to $(3x^3)^3$?
1) $9x^5$
2) $9x^6$
3) $27x^5$
4) $27x^6$
An online music club has a one-time registration fee of $13.95 and charges $0.49 to buy each song. If Emma has $50.00 to join the club and buy songs, what is the maximum number of songs she can buy?

1) 73
2) 74
3) 130
4) 131

What is the sum of \( \frac{d}{2} \) and \( \frac{2d}{3} \) expressed in simplest form?

1) \( \frac{3d}{5} \)
2) \( \frac{3d}{6} \)
3) \( \frac{7d}{5} \)
4) \( \frac{7d}{6} \)

What is an equation of the line that passes through the point \((3, -1)\) and has a slope of 2?

1) \( y = 2x + 5 \)
2) \( y = 2x - 1 \)
3) \( y = 2x - 4 \)
4) \( y = 2x - 7 \)

Which value of \( x \) is a solution of \( \frac{5}{ x } = \frac{x + 13}{6} \)?

1) -2
2) -3
3) -10
4) -15

If the formula for the perimeter of a rectangle is \( P = 2l + 2w \), then \( w \) can be expressed as

1) \( w = \frac{2l - P}{2} \)
2) \( w = \frac{P - 2l}{2} \)
3) \( w = \frac{P - l}{2} \)
4) \( w = \frac{P - 2w}{2l} \)

A school wants to add a coed soccer program. To determine student interest in the program, a survey will be taken. In order to get an unbiased sample, which group should the school survey?

1) every third student entering the building
2) every member of the varsity football team
3) every member in Ms. Zimmer’s drama classes
4) every student having a second-period French class

In the diagram of \( \triangle ABC \) shown below, \( BC = 10 \) and \( AB = 16 \).

To the nearest tenth of a degree, what is the measure of the largest acute angle in the triangle?

1) 32.0
2) 38.7
3) 51.3
4) 90.0
534 The faces of a cube are numbered from 1 to 6. If the cube is tossed once, what is the probability that a prime number or a number divisible by 2 is obtained?

1) \( \frac{6}{6} \)
2) \( \frac{5}{6} \)
3) \( \frac{4}{6} \)
4) \( \frac{1}{6} \)

535 What is an equation for the line that passes through the coordinates (2, 0) and (0,3)?

1) \( y = -\frac{3}{2}x + 3 \)
2) \( y = \frac{3}{2}x - 3 \)
3) \( y = \frac{2}{3}x + 2 \)
4) \( y = \frac{2}{3}x - 2 \)

536 An electronics store sells DVD players and cordless telephones. The store makes a $75 profit on the sale of each DVD player \( d \) and a $30 profit on the sale of each cordless telephone \( c \). The store wants to make a profit of at least $255.00 from its sales of DVD players and cordless phones. Which inequality describes this situation?

1) \( 75d + 30c < 255 \)
2) \( 75d + 30c \leq 255 \)
3) \( 75d + 30c > 255 \)
4) \( 75d + 30c \geq 255 \)

537 Which equation represents the axis of symmetry of the graph of the parabola below?

1) \( y = -3 \)
2) \( x = -3 \)
3) \( y = -25 \)
4) \( x = -25 \)

538 What is the slope of the line that passes through the points (2, 5) and (7, 3)?

1) \( -\frac{5}{2} \)
2) \( -\frac{2}{5} \)
3) \( \frac{8}{9} \)
4) \( \frac{9}{8} \)
Ryan estimates the measurement of the volume of a popcorn container to be 282 cubic inches. The actual volume of the popcorn container is 289 cubic inches. What is the relative error of Ryan's measurement to the nearest thousandth?

1) 0.024
2) 0.025
3) 0.096
4) 1.025

What is the value of \( x \) in the equation

\[
\frac{2}{x} - 3 = \frac{26}{x}
\]

1) -8
2) \(-\frac{1}{8}\)
3) \(\frac{1}{8}\)
4) 8
541 Clayton has three fair coins. Find the probability that he gets two tails and one head when he flips the three coins.

542 Solve for $c$ in terms of $a$ and $b$: $bc + ac = ab$

543 The table below represents the number of hours a student worked and the amount of money the student earned.

<table>
<thead>
<tr>
<th>Number of Hours</th>
<th>Dollars Earned</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 h</td>
<td>$50.00</td>
</tr>
<tr>
<td>15 h</td>
<td>$93.75</td>
</tr>
<tr>
<td>19 h</td>
<td>$118.75</td>
</tr>
<tr>
<td>30 h</td>
<td>$187.50</td>
</tr>
</tbody>
</table>

Write an equation that represents the number of dollars, $d$, earned in terms of the number of hours, $h$, worked. Using this equation, determine the number of dollars the student would earn for working 40 hours.

544 Express in simplest form: \[ \frac{x^2 - 1}{x^2 + 3x + 2} \]

545 Factor completely: $5x^3 - 20x^2 - 60x$

546 Alexis calculates the surface area of a gift box as 600 square inches. The actual surface area of the gift box is 592 square inches. Find the relative error of Alexis' calculation expressed as a decimal to the nearest thousandth.

547 Students calculated the area of a playing field to be 8,100 square feet. The actual area of the field is 7,678.5 square feet. Find the relative error in the area, to the nearest thousandth.

548 Mrs. Chen owns two pieces of property. The areas of the properties are 77,120 square feet and 33,500 square feet.

Find the total number of acres Mrs. Chen owns, to the nearest hundredth of an acre.

549 A jogger ran at a rate of 5.4 miles per hour. Find the jogger's exact rate, in feet per minute.

550 Roberta needs ribbon for a craft project. The ribbon sells for $3.75 per yard. Find the cost, in dollars, for 48 inches of the ribbon.
551 Simplify: \( \frac{27k^5m^8}{(4k^3)(9m^2)} \)

552 Solve for \( g \): \( 3 + 2g = 5g - 9 \)

553 State the value of the expression \( \frac{(4.1 \times 10^2)(2.4 \times 10^3)}{(1.5 \times 10^7)} \) in scientific notation.

554 A window is made up of a single piece of glass in the shape of a semicircle and a rectangle, as shown in the diagram below. Tess is decorating for a party and wants to put a string of lights all the way around the outside edge of the window.

To the nearest foot, what is the length of the string of lights that Tess will need to decorate the window?

555 Express \(-3\sqrt{48}\) in simplest radical form.

556 As shown in the diagram below, a ladder 5 feet long leans against a wall and makes an angle of 65° with the ground. Find, to the nearest tenth of a foot, the distance from the wall to the base of the ladder.

557 Determine how many three-letter arrangements are possible with the letters \( A, N, G, L, \) and \( E \) if no letter may be repeated.

558 Casey purchased a pack of assorted flower seeds and planted them in her garden. When the first 25 flowers bloomed, 11 were white, 5 were red, 3 were blue, and the rest were yellow. Find the empirical probability that a flower that blooms will be yellow.
559 The area of a rectangle is represented by 
\[ x^2 - 5x - 24. \] If the width of the rectangle is 
represented by \( x - 8 \), express the length of the 
rectangle as a binomial.

560 A method for solving \( 5(x - 2) - 2(x - 5) = 9 \) is 
shown below. Identify the property used to obtain 
each of the two indicated steps.

\[
\begin{align*}
(1) & \quad 5x - 10 - 2x + 10 = 9 \\
(2) & \quad 3x + 0 = 9 \\
& \quad 3x + 9 \\
& \quad x = 3.
\end{align*}
\]

561 Express the product of \( \frac{x + 2}{2} \) and \( \frac{4x + 20}{x^2 + 6x + 8} \) in 
simplest form.

562 In a game of ice hockey, the hockey puck took 0.8 
second to travel 89 feet to the goal line. Determine 
the average speed of the puck in feet per second.

563 Solve the inequality \( -5(x - 7) < 15 \) algebraically for 
\( x \).

564 Express \( 5\sqrt{72} \) in simplest radical form.

565 The square dart board shown below has a side that 
measures 40 inches. The shaded portion in the 
center is a square whose side is 15 inches. A dart 
thrown at the board is equally likely to land on any 
point on the dartboard.

Find the probability that a dart hitting the board 
will not land in the shaded area.

566 On the set of axes below, graph \( y = 3^x \) over the 
interval \(-1 \leq x \leq 2\).
567 Maureen tracks the range of outdoor temperatures over three days. She records the following information.

Express the intersection of the three sets as an inequality in terms of temperature, $t$.

568 A designer created the logo shown below. The logo consists of a square and four quarter-circles of equal size.

Express, in terms of $\pi$, the exact area, in square inches, of the shaded region.

569 Express in simplest form: $\frac{45a^4b^3 - 90a^3b}{15a^2b}$

570 Brianna is using the two spinners shown below to play her new board game. She spins the arrow on each spinner once. Brianna uses the first spinner to determine how many spaces to move. She uses the second spinner to determine whether her move from the first spinner will be forward or backward.

Find the probability that Brianna will move fewer than four spaces and backward.

571 Chad complained to his friend that he had five equations to solve for homework. Are all of the homework problems equations? Justify your answer.
572 Serena’s garden is a rectangle joined with a semicircle, as shown in the diagram below. Line segment $AB$ is the diameter of semicircle $P$. Serena wants to put a fence around her garden.

![Diagram of Serena's garden]

Calculate the length of fence Serena needs to the nearest tenth of a foot.

573 Express $2\sqrt{108}$ in simplest radical form.

574 Jon is buying tickets for himself for two concerts. For the jazz concert, 4 tickets are available in the front row, and 32 tickets are available in the other rows. For the orchestra concert, 3 tickets are available in the front row, and 23 tickets are available in the other rows. Jon is randomly assigned one ticket for each concert. Determine the concert for which he is more likely to get a front-row ticket. Justify your answer.

575 The distance from Earth to Mars is 136,000,000 miles. A spaceship travels at 31,000 miles per hour. Determine, to the nearest day, how long it will take the spaceship to reach Mars.

576 Angela wants to purchase carpeting for her living room. The dimensions of her living room are 12 feet by 12 feet. If carpeting is sold by the square yard, determine how many square yards of carpeting she must purchase.

577 Three storage bins contain colored blocks. Bin 1 contains 15 red and 14 blue blocks. Bin 2 contains 16 white and 15 blue blocks. Bin 3 contains 15 red and 15 white blocks. All of the blocks from the three bins are placed into one box. If one block is randomly selected from the box, which color block would most likely be picked? Justify your answer.

578 Twelve players make up a high school basketball team. The team jerseys are numbered 1 through 12. The players wearing the jerseys numbered 3, 6, 7, 8, and 11 are the only players who start a game. Using set notation, list the complement of this subset.

579 The length and width of the base of a rectangular prism are 5.5 cm and 3 cm. The height of the prism is 6.75 cm. Find the exact value of the surface area of the prism, in square centimeters.

580 In right triangle $ABC$, $AB = 20$, $AC = 12$, $BC = 16$, and $\angle C = 90^\circ$. Find, to the nearest degree, the measure of $\angle A$. 

95
581 Oatmeal is packaged in a cylindrical container, as shown in the diagram below.

The diameter of the container is 13 centimeters and its height is 24 centimeters. Determine, in terms of \( \pi \), the volume of the cylinder, in cubic centimeters.

582 Joseph typed a 1,200-word essay in 25 minutes. At this rate, determine how many words he can type in 45 minutes.

583 Perform the indicated operation: \(-6(a - 7)\)
State the name of the property used.

584 Some books are laid on a desk. Two are English, three are mathematics, one is French, and four are social studies. Theresa selects an English book and Isabelle then selects a social studies book. Both girls take their selections to the library to read. If Truman then selects a book at random, what is the probability that he selects an English book?

585 A communications company is building a 30-foot antenna to carry cell phone transmissions. As shown in the diagram below, a 50-foot wire from the top of the antenna to the ground is used to stabilize the antenna.

Find, to the nearest degree, the measure of the angle that the wire makes with the ground.

586 On the set of axes below, graph \( y = 2|x + 3| \).
Include the interval \(-7 \leq x \leq 1\).
587 Ms. Hopkins recorded her students' final exam scores in the frequency table below.

<table>
<thead>
<tr>
<th>Interval</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>61–70</td>
<td>###</td>
<td>5</td>
</tr>
<tr>
<td>71–80</td>
<td>####</td>
<td>4</td>
</tr>
<tr>
<td>81–90</td>
<td>#####</td>
<td>9</td>
</tr>
<tr>
<td>91–100</td>
<td>###</td>
<td>6</td>
</tr>
</tbody>
</table>

On the grid below, construct a frequency histogram based on the table.

588 The diagram below represents Joe's two fish tanks.

Joe's larger tank is completely filled with water. He takes water from it to completely fill the small tank. Determine how many cubic inches of water will remain in the larger tank.

589 Solve the following system of equations algebraically for $y$:

\[
2x + 2y = 9 \\
2x - y = 3
\]

590 Factor completely: $4x^3 - 36x$

591 Tom drove 290 miles from his college to home and used 23.2 gallons of gasoline. His sister, Ann, drove 225 miles from her college to home and used 15 gallons of gasoline. Whose vehicle had better gas mileage? Justify your answer.

592 State the equation of the axis of symmetry and the coordinates of the vertex of the parabola graphed below.
593 Express $4\sqrt{75}$ in simplest radical form.

594 Adrianne invested $2000 in an account at a 3.5% interest rate compounded annually. She made no deposits or withdrawals on the account for 4 years. Determine, to the nearest dollar, the balance in the account after the 4 years.
595. The chart below compares two runners.

<table>
<thead>
<tr>
<th>Runner</th>
<th>Distance, in miles</th>
<th>Time, in hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greg</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>Dave</td>
<td>16</td>
<td>3</td>
</tr>
</tbody>
</table>

Based on the information in this chart, state which runner has the faster rate. Justify your answer.

596. On the set of axes below, graph and label the equations \( y = |x| \) and \( y = 3|x| \) for the interval \(-3 \leq x \leq 3\).

597. A turtle and a rabbit are in a race to see who is first to reach a point 100 feet away. The turtle travels at a constant speed of 20 feet per minute for the entire 100 feet. The rabbit travels at a constant speed of 40 feet per minute for the first 50 feet, stops for 3 minutes, and then continues at a constant speed of 40 feet per minute for the last 50 feet. Determine which animal won the race and by how much time.

598. Given: \( A = \{18, 6, -3, -12\} \)
Determine all elements of set \( A \) that are in the solution of the inequality \( \frac{2}{3}x + 3 < -2x - 7 \).

599. Express \( \frac{3\sqrt{75} + \sqrt{27}}{3} \) in simplest radical form.

600. A soup can is in the shape of a cylinder. The can has a volume of 342 cm\(^3\) and a diameter of 6 cm. Express the height of the can in terms of \( \pi \).
Determine the maximum number of soup cans that can be stacked on their base between two shelves if the distance between the shelves is exactly 36 cm. Explain your answer.

601. Express \( \frac{16\sqrt{21}}{2\sqrt{7}} - 5\sqrt{12} \) in simplest radical form.
602 The difference between two numbers is 28. The larger number is 8 less than twice the smaller number. Find both numbers. [Only an algebraic solution can receive full credit.]

603 A line having a slope of \( \frac{3}{4} \) passes through the point \((-8, 4)\). Write the equation of this line in slope-intercept form.

604 Perform the indicated operation and simplify:
\[
\frac{3x + 6}{4x + 12} \div \frac{x^2 - 4}{x + 3}
\]

605 A prom ticket at Smith High School is $120. Tom is going to save money for the ticket by walking his neighbor’s dog for $15 per week. If Tom already has saved $22, what is the minimum number of weeks Tom must walk the dog to earn enough to pay for the prom ticket?

606 Sarah measures her rectangular bedroom window for a new shade. Her measurements are 36 inches by 42 inches. The actual measurements of the window are 36.5 inches and 42.5 inches. Using the measurements that Sarah took, determine the number of square inches in the area of the window. Determine the number of square inches in the actual area of the window. Determine the relative error in calculating the area. Express your answer as a decimal to the nearest thousandth.

607 The following cumulative frequency histogram shows the distances swimmers completed in a recent swim test.

![Cumulative Frequency Histogram](image)

Based on the cumulative frequency histogram, determine the number of swimmers who swam between 200 and 249 yards. Determine the number of swimmers who swam between 150 and 199 yards. Determine the number of swimmers who took the swim test.

608 Find the roots of the equation \( x^2 = 30 - 13x \) algebraically.

609 Solve algebraically for \( x \):
\[
\frac{x + 2}{6} = \frac{3}{x - 1}
\]
610 In the diagram below, the circumference of circle $O$ is $16\pi$ inches. The length of $BC$ is three-quarters of the length of diameter $AD$ and $CE = 4$ inches. Calculate the area, in square inches, of trapezoid $ABCD$.

611 On the set of axes below, solve the following system of equations graphically. State the coordinates of the solution.

\[
\begin{align*}
y &= 4x - 1 \\
2x + y &= 5
\end{align*}
\]

612 Given the following list of students' scores on a quiz:

5, 12, 7, 15, 20, 14, 7

Determine the median of these scores. Determine the mode of these scores. The teacher decides to adjust these scores by adding three points to each score. Explain the effect, if any, that this will have on the median and mode of these scores.

613 Chelsea has $45 to spend at the fair. She spends $20 on admission and $15 on snacks. She wants to play a game that costs $0.65 per game. Write an inequality to find the maximum number of times, $x$, Chelsea can play the game. Using this inequality, determine the maximum number of times she can play the game.

614 Ashley measured the dimensions of a rectangular prism to be 6 cm by 10 cm by 1.5 cm. The actual dimensions are 5.9 cm by 10.3 cm by 1.7 cm. Determine the relative error, to the nearest thousandth, in calculating the volume of the prism.

615 Express the product of $3\sqrt{20} (2\sqrt{5} - 7)$ in simplest radical form.

616 A man standing on level ground is 1000 feet away from the base of a 350-foot-tall building. Find, to the nearest degree, the measure of the angle of elevation to the top of the building from the point on the ground where the man is standing.
617 The test scores for 18 students in Ms. Mosher’s class are listed below:
86, 81, 79, 71, 58, 87, 52, 71, 87, 87, 93, 64, 94, 81, 76, 98, 94, 68
Complete the frequency table below.

<table>
<thead>
<tr>
<th>Interval</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>51–60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>61–70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>71–80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>81–90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>91–100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Draw and label a frequency histogram on the grid below.

618 The cost of three notebooks and four pencils is $8.50. The cost of five notebooks and eight pencils is $14.50. Determine the cost of one notebook and the cost of one pencil. [Only an algebraic solution can receive full credit.]

619 A trapezoid is shown below.

Calculate the measure of angle $x$, to the nearest tenth of a degree.

620 Solve the following system of equations algebraically for all values of $x$ and $y$.
\[ y = x^2 + 2x - 8 \]
\[ y = 2x + 1 \]

621 Graph the equation $y = x^2 - 2x - 3$ on the accompanying set of axes. Using the graph, determine the roots of the equation $x^2 - 2x - 3 = 0$. 

102
622 The Hudson Record Store is having a going-out-of-business sale. CDs normally sell for $18.00. During the first week of the sale, all CDs will sell for $15.00. Written as a fraction, what is the rate of discount? What is this rate expressed as a percent? Round your answer to the nearest hundredth of a percent. During the second week of the sale, the same CDs will be on sale for 25% off the original price. What is the price of a CD during the second week of the sale?

623 The number of songs fifteen students have on their MP3 players is:

120, 124, 132, 145, 200, 255, 260, 292, 308, 314, 342, 407, 421, 435, 452

State the values of the minimum, 1st quartile, median, 3rd quartile, and maximum. Using these values, construct a box-and-whisker plot using an appropriate scale on the line below.

624 On the set of axes below, draw the graph of \( y = 2^x \) over the interval \(-1 \leq x \leq 3\). Will this graph ever intersect the x-axis? Justify your answer.

625 Find algebraically the equation of the axis of symmetry and the coordinates of the vertex of the parabola whose equation is \( y = -2x^2 - 8x + 3 \).

626 Mr. Laub has three children: two girls (Sue and Karen) and one boy (David). After each meal, one child is chosen at random to wash dishes. If the same child can be chosen for both lunch and dinner, construct a tree diagram or list a sample space of all the possible outcomes of who will wash dishes after lunch and dinner on Saturday. Determine the probability that one boy and one girl will wash dishes after lunch and dinner on Saturday.
627 Janis measures the dimensions of the floor in her rectangular classroom for a rug. Her measurements are 10.50 feet by 12.25 feet. The actual measurements of the floor are 10.75 feet by 12.50 feet. Determine the relative error in calculating the area, to the nearest thousandth.

628 Using his ruler, Howell measured the sides of a rectangular prism to be 5 cm by 8 cm by 4 cm. The actual measurements are 5.3 cm by 8.2 cm by 4.1 cm. Find Howell’s relative error in calculating the volume of the prism, to the nearest thousandth.

629 Find the roots of the equation \(x^2 - x = 6\) algebraically.

630 A 28-foot ladder is leaning against a house. The bottom of the ladder is 6 feet from the base of the house. Find the measure of the angle formed by the ladder and the ground, to the nearest degree.

631 Write an equation that represents the line that passes through the points (5,4) and \((-5,0)\).

632 Miller's Department Store is having a sale with a 25% discount on mattresses. If the sales tax rate is 8%, how much change will Frank receive from $800 if he purchases a mattress regularly priced at $895 during this sale?

633 Solve algebraically for \(x\): \(2(x - 4) \geq \frac{1}{2} (5 - 3x)\)

634 Ms. Mosher recorded the math test scores of six students in the table below.

<table>
<thead>
<tr>
<th>Student</th>
<th>Student Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andrew</td>
<td>72</td>
</tr>
<tr>
<td>John</td>
<td>80</td>
</tr>
<tr>
<td>George</td>
<td>85</td>
</tr>
<tr>
<td>Amber</td>
<td>93</td>
</tr>
<tr>
<td>Betty</td>
<td>78</td>
</tr>
<tr>
<td>Roberto</td>
<td>80</td>
</tr>
</tbody>
</table>

Determine the mean of the student scores, to the nearest tenth. Determine the median of the student scores. Describe the effect on the mean and the median if Ms. Mosher adds 5 bonus points to each of the six students’ scores.

635 Express \(\sqrt{25} - 2\sqrt{3} + \sqrt{27} + 2\sqrt{9}\) in simplest radical form.

636 Find the volume, in cubic centimeters, and the surface area, in square centimeters, of the rectangular prism shown below.

637...
637 Graph and label the following equations on the set of axes below.

\[ y = |x| \]

\[ y = \frac{1}{2} x \]

Explain how decreasing the coefficient of \( x \) affects the graph of the equation \( y = |x| \).

638 Hannah took a trip to visit her cousin. She drove 120 miles to reach her cousin’s house and the same distance back home. It took her 1.2 hours to get halfway to her cousin’s house. What was her average speed, in miles per hour, for the first 1.2 hours of the trip? Hannah’s average speed for the remainder of the trip to her cousin’s house was 40 miles per hour. How long, in hours, did it take her to drive the remaining distance? Traveling home along the same route, Hannah drove at an average rate of 55 miles per hour. After 2 hours her car broke down. How many miles was she from home?

639 Megan and Bryce opened a new store called the Donut Pit. Their goal is to reach a profit of $20,000 in their 18th month of business. The table and scatter plot below represent the profit, \( P \), in thousands of dollars, that they made during the first 12 months.

<table>
<thead>
<tr>
<th>t (months)</th>
<th>P (profit, in thousands of dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.0</td>
</tr>
<tr>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td>3</td>
<td>4.0</td>
</tr>
<tr>
<td>4</td>
<td>5.0</td>
</tr>
<tr>
<td>5</td>
<td>6.5</td>
</tr>
<tr>
<td>6</td>
<td>5.5</td>
</tr>
<tr>
<td>7</td>
<td>7.0</td>
</tr>
<tr>
<td>8</td>
<td>6.0</td>
</tr>
<tr>
<td>9</td>
<td>7.5</td>
</tr>
<tr>
<td>10</td>
<td>7.0</td>
</tr>
<tr>
<td>11</td>
<td>9.0</td>
</tr>
<tr>
<td>12</td>
<td>9.5</td>
</tr>
</tbody>
</table>

Draw a reasonable line of best fit. Using the line of best fit, predict whether Megan and Bryce will reach their goal in the 18th month of their business. Justify your answer.
640 The table below shows the number of prom tickets sold over a ten-day period.

<table>
<thead>
<tr>
<th>Day (x)</th>
<th>1</th>
<th>2</th>
<th>5</th>
<th>7</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Prom Tickets Sold (y)</td>
<td>30</td>
<td>35</td>
<td>55</td>
<td>60</td>
<td>70</td>
</tr>
</tbody>
</table>

Plot these data points on the coordinate grid below. Use a consistent and appropriate scale. Draw a reasonable line of best fit and write its equation.

641 Peter begins his kindergarten year able to spell 10 words. He is going to learn to spell 2 new words every day. Write an inequality that can be used to determine how many days, \( d \), it takes Peter to be able to spell at least 75 words. Use this inequality to determine the minimum number of whole days it will take for him to be able to spell at least 75 words.

642 The menu for the high school cafeteria is shown below.

<table>
<thead>
<tr>
<th>Main Course</th>
<th>Vegetable</th>
<th>Dessert</th>
<th>Beverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>veggie burger</td>
<td>corn</td>
<td>gelatin</td>
<td>milk</td>
</tr>
<tr>
<td>pizza</td>
<td>green beans</td>
<td>fruit salad</td>
<td>juice</td>
</tr>
<tr>
<td>tuna sandwich</td>
<td>carrots</td>
<td>yogurt</td>
<td>bottled water</td>
</tr>
<tr>
<td>frankfurter</td>
<td>cookie</td>
<td></td>
<td></td>
</tr>
<tr>
<td>chicken tenders</td>
<td>ice cream cup</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Determine the number of possible meals consisting of a main course, a vegetable, a dessert, and a beverage that can be selected from the menu. Determine how many of these meals will include chicken tenders. If a student chooses pizza, corn or carrots, a dessert, and a beverage from the menu, determine the number of possible meals that can be selected.

643 On the set of axes below, graph the equation \( y = x^2 + 2x - 8 \). Using the graph, determine and state the roots of the equation \( x^2 + 2x - 8 = 0 \).
644 At the end of week one, a stock had increased in value from $5.75 a share to $7.50 a share. Find the percent of increase at the end of week one to the nearest tenth of a percent. At the end of week two, the same stock had decreased in value from $7.50 to $5.75. Is the percent of decrease at the end of week two the same as the percent of increase at the end of week one? Justify your answer.

645 A bank is advertising that new customers can open a savings account with a 3 $\frac{3}{4}$% interest rate compounded annually. Robert invests $5,000 in an account at this rate. If he makes no additional deposits or withdrawals on his account, find the amount of money he will have, to the nearest cent, after three years.

646 A plastic storage box in the shape of a rectangular prism has a length of $x + 3$, a width of $x - 4$, and a height of 5. Represent the surface area of the box as a trinomial in terms of $x$.

647 In a game, a player must spin each spinner shown in the diagram below once.

![Spinners](image)

Draw a tree diagram or list a sample space showing all possible outcomes. Determine the number of outcomes that consist of a prime number and a letter in the word “CAT.”

648 Wendy measures the floor in her rectangular bedroom for new carpeting. Her measurements are 24 feet by 14 feet. The actual measurements are 24.2 feet by 14.1 feet. Determine the relative error in calculating the area of her bedroom. Express your answer as a decimal to the nearest thousandth.
649 The test scores from Mrs. Gray’s math class are shown below.
72, 73, 66, 71, 82, 85, 85, 86, 89, 91, 92
Construct a box-and-whisker plot to display these data.

650 Vince buys a box of candy that consists of six chocolate pieces, four fruit-flavored pieces, and two mint pieces. He selects three pieces of candy at random, without replacement. Calculate the probability that the first piece selected will be fruit flavored and the other two will be mint. Calculate the probability that all three pieces selected will be the same type of candy.

651 Shana wants to buy a new bicycle that has a retail price of $259.99. She knows that it will be on sale next week for 30% off the retail price. If the tax rate is 7%, find the total amount, to the nearest cent, that she will save by waiting until next week.

652 Express in simplest form:
\[
\frac{x^2 + 9x + 14}{x^2 - 49} + \frac{3x + 6}{x^2 + x - 56}
\]

653 A large company must choose between two types of passwords to log on to a computer. The first type is a four-letter password using any of the 26 letters of the alphabet, without repetition of letters. The second type is a six-digit password using the digits 0 through 9, with repetition of digits allowed. Determine the number of possible four-letter passwords. Determine the number of possible six-digit passwords. The company has 500,000 employees and needs a different password for each employee. State which type of password the company should choose. Explain your answer.

654 A restaurant sells kids' meals consisting of one main course, one side dish, and one drink, as shown in the table below.

<table>
<thead>
<tr>
<th>Kids' Meal Choices</th>
<th>Main Course</th>
<th>Side Dish</th>
<th>Drink</th>
</tr>
</thead>
<tbody>
<tr>
<td>hamburger</td>
<td>French fries</td>
<td>applesauce</td>
<td>milk</td>
</tr>
<tr>
<td>chicken nuggets</td>
<td></td>
<td>juice</td>
<td></td>
</tr>
<tr>
<td>turkey sandwich</td>
<td></td>
<td>soda</td>
<td></td>
</tr>
</tbody>
</table>

Draw a tree diagram or list the sample space showing all possible kids' meals. How many different kids' meals can a person order? Jose does not drink juice. Determine the number of different kids' meals that do not include juice. Jose's sister will eat only chicken nuggets for her main course. Determine the number of different kids' meals that include chicken nuggets.

655 Solve for \( m \):
\[
\frac{m}{5} + \frac{3(m - 1)}{2} = 2(m - 3)
\]
656 On the set of axes below, graph the following system of equations. Using the graph, determine and state all solutions of the system of equations.

\[ y = -x^2 - 2x + 3 \]
\[ y + 1 = -2x \]

657 An oil company distributes oil in a metal can shaped like a cylinder that has an actual radius of 5.1 cm and a height of 15.1 cm. A worker incorrectly measured the radius as 5 cm and the height as 15 cm. Determine the relative error in calculating the surface area, to the nearest thousandth.

658 Solve the following system of equations algebraically:

\[ 3x + 2y = 4 \]
\[ 4x + 3y = 7 \]

[Only an algebraic solution can receive full credit.]

659 On the set of axes below, graph the following system of inequalities and state the coordinates of a point in the solution set.

\[ 2x - y \geq 6 \]
\[ x > 2 \]

660 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.

Determine, to the nearest foot, how far the bottom of the pipe is from the base of the fence.

Determine, to the nearest foot, the length of the metal pipe.
661 Solve the following systems of equations graphically, on the set of axes below, and state the coordinates of the point(s) in the solution set.

\[ y = x^2 - 6x + 5 \]
\[ 2x + y = 5 \]

662 A company is running a contest and offering a first, second, and third prize. First prize is a choice of a car or $15,000 cash. Second prize is a choice of a motorbike, a trip to New York City, or $2,000 cash. Third prize is a choice of a television or $500 cash. If each prize is equally likely to be selected, list the sample space or draw a tree diagram of all possible different outcomes of first, second, and third prizes. Determine the number of ways that all three prizes selected could be cash. Determine the number of ways that none of the three prizes selected could be cash.

663 A hot-air balloon is tied to the ground with two taut (straight) ropes, as shown in the diagram below. One rope is directly under the balloon and makes a right angle with the ground. The other rope forms an angle of 50° with the ground.

Determine the height, to the nearest foot, of the balloon directly above the ground. Determine the distance, to the nearest foot, on the ground between the two ropes.

664 An outfit Jennifer wears to school consists of a top, a bottom, and shoes. Possible choices are listed below.

- Tops: T-shirt, blouse, sweater
- Bottoms: jeans, skirt, capris
- Shoes: flip-flops, sneakers

List the sample space or draw a tree diagram to represent all possible outfits consisting of one type of top, one type of bottom, and one pair of shoes. Determine how many different outfits contain jeans and flip-flops. Determine how many different outfits do not include a sweater.
665 A stake is to be driven into the ground away from the base of a 50-foot pole, as shown in the diagram below. A wire from the stake on the ground to the top of the pole is to be installed at an angle of elevation of 52°.

How far away from the base of the pole should the stake be driven in, to the nearest foot? What will be the length of the wire from the stake to the top of the pole, to the nearest foot?

666 A sandwich consists of one type of bread, one type of meat, and one type of cheese. The possible choices are listed below.

Bread: white, rye
Meat: ham, turkey, beef
Cheese: American, Swiss

Draw a tree diagram or list a sample space of all the possible different sandwiches consisting of one type of bread, one type of meat, and one type of cheese. Determine the number of sandwiches that will not include turkey. Determine the number of sandwiches that will include rye bread and Swiss cheese.

667 Solve algebraically for x: \( \frac{3}{4} = \frac{-(x + 11)}{4x} + \frac{1}{2x} \)

668 In right triangle \( ABC \) shown below, \( AC = 29 \) inches, \( AB = 17 \) inches, and \( \angle ABC = 90 \). Find the number of degrees in the measure of angle \( BAC \), to the nearest degree.

Find the length of \( BC \) to the nearest inch.

669 The cost of 3 markers and 2 pencils is $1.80. The cost of 4 markers and 6 pencils is $2.90. What is the cost of each item? Include appropriate units in your answer.

670 Solve algebraically: \( \frac{2}{3x} + \frac{4}{x} = \frac{7}{x+1} \)
[Only an algebraic solution can receive full credit.]

671 The Booster Club raised $30,000 for a sports fund. No more money will be placed into the fund. Each year the fund will decrease by 5%. Determine the amount of money, to the nearest cent, that will be left in the sports fund after 4 years.
672 A password consists of three digits, 0 through 9, followed by three letters from an alphabet having 26 letters. If repetition of digits is allowed, but repetition of letters is not allowed, determine the number of different passwords that can be made. If repetition is not allowed for digits or letters, determine how many fewer different passwords can be made.

673 Twenty students were surveyed about the number of days they played outside in one week. The results of this survey are shown below.

\{6,5,4,3,0,7,1,5,4,4,3,2,2,3,2,4,3,4,0,7\}

Complete the frequency table below for these data.

<table>
<thead>
<tr>
<th>Interval</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2–3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4–5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6–7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Complete the cumulative frequency table below using these data.

<table>
<thead>
<tr>
<th>Number of Days Outside</th>
<th>Interval</th>
<th>Cumulative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0–1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0–3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0–5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0–7</td>
<td></td>
</tr>
</tbody>
</table>

674 On the set of axes below, solve the following system of equations graphically and state the coordinates of all points in the solution set.

\[
y = -x^2 + 6x - 3
\]

\[
x + y = 7
\]
675 On the set of axes below, graph the following system of inequalities.

\[ y + x \geq 3 \]
\[ 5x - 2y > 10 \]

State the coordinates of one point that satisfies \( y + x \geq 3 \), but does not satisfy \( 5x - 2y > 10 \).

676 Sophie measured a piece of paper to be 21.7 cm by 28.5 cm. The piece of paper is actually 21.6 cm by 28.4 cm. Determine the number of square centimeters in the area of the piece of paper using Sophie’s measurements. Determine the number of square centimeters in the actual area of the piece of paper. Determine the relative error in calculating the area. Express your answer as a decimal to the nearest thousandth. Sophie does not think there is a significant amount of error. Do you agree or disagree? Justify your answer.

677 The prices of seven race cars sold last week are listed in the table below.

<table>
<thead>
<tr>
<th>Price per Race Car</th>
<th>Number of Race Cars</th>
</tr>
</thead>
<tbody>
<tr>
<td>$126,000</td>
<td>1</td>
</tr>
<tr>
<td>$140,000</td>
<td>2</td>
</tr>
<tr>
<td>$180,000</td>
<td>1</td>
</tr>
<tr>
<td>$400,000</td>
<td>2</td>
</tr>
<tr>
<td>$819,000</td>
<td>1</td>
</tr>
</tbody>
</table>

What is the mean value of these race cars, in dollars? What is the median value of these race cars, in dollars? State which of these measures of central tendency best represents the value of the seven race cars. Justify your answer.

678 The values of 11 houses on Washington St. are shown in the table below.

<table>
<thead>
<tr>
<th>Value per House</th>
<th>Number of Houses</th>
</tr>
</thead>
<tbody>
<tr>
<td>$100,000</td>
<td>1</td>
</tr>
<tr>
<td>$175,000</td>
<td>5</td>
</tr>
<tr>
<td>$200,000</td>
<td>4</td>
</tr>
<tr>
<td>$700,000</td>
<td>1</td>
</tr>
</tbody>
</table>

Find the mean value of these houses in dollars. Find the median value of these houses in dollars. State which measure of central tendency, the mean or the median, best represents the values of these 11 houses. Justify your answer.
679 Graph the following systems of inequalities on the set of axes shown below and label the solution set $S$:

\[
\begin{align*}
y &> -x + 2 \\
y &\leq \frac{2}{3}x + 5
\end{align*}
\]

680 Solve for $x$:

\[
\frac{x + 1}{x} = \frac{-7}{x - 12}
\]

681 Express in simplest form:

\[
\frac{3x^2 + 9x}{x^2 + 5x + 6} + \frac{x^2 - 9}{x^2 - x - 6}
\]

682 Find three consecutive positive even integers such that the product of the second and third integers is twenty more than ten times the first integer. [Only an algebraic solution can receive full credit.]

683 Express in simplest form:

\[
\frac{2x^2 - 8x - 42}{6x^2} \div \frac{x^2 - 9}{x^2 - 3x}
\]

684 Solve algebraically for $x$:

\[
3(x + 1) - 5x = 12 - (6x - 7)
\]

685 On the set of axes below, solve the following system of equations graphically and state the coordinates of all points in the solution set.

\[
\begin{align*}
y &= x^2 + 4x - 5 \\
y &= x - 1
\end{align*}
\]

686 The sum of three consecutive odd integers is 18 less than five times the middle number. Find the three integers. [Only an algebraic solution can receive full credit.]
687 A jar contains five red marbles and three green marbles. A marble is drawn at random and not replaced. A second marble is then drawn from the jar. Find the probability that the first marble is red and the second marble is green. Find the probability that both marbles are red. Find the probability that both marbles are the same color.

688 Each of the hats shown below has colored marbles placed inside. Hat A contains five green marbles and four red marbles. Hat B contains six blue marbles and five red marbles. Hat C contains five green marbles and five blue marbles.

If a student were to randomly pick one marble from each of these three hats, determine from which hat the student would most likely pick a green marble. Justify your answer. Determine the fewest number of marbles, if any, and the color of these marbles that could be added to each hat so that the probability of picking a green marble will be one-half in each of the three hats.

689 In the diagram below of rectangle $AFEB$ and a semicircle with diameter $CD, AB = 5$ inches, $AB = BC = DE = FE$, and $CD = 6$ inches. Find the area of the shaded region, to the nearest hundredth of a square inch.

690 Graph the solution set for the inequality $4x - 3y > 9$ on the set of axes below. Determine if the point $(1, -3)$ is in the solution set. Justify your answer.

691 A contractor needs 54 square feet of brick to construct a rectangular walkway. The length of the walkway is 15 feet more than the width. Write an equation that could be used to determine the dimensions of the walkway. Solve this equation to find the length and width, in feet, of the walkway.

692 Mike buys his ice cream packed in a rectangular prism-shaped carton, while Carol buys hers in a cylindrical-shaped carton. The dimensions of the prism are 5 inches by 3.5 inches by 7 inches. The cylinder has a diameter of 5 inches and a height of 7 inches. Which container holds more ice cream? Justify your answer. Determine, to the nearest tenth of a cubic inch, how much more ice cream the larger container holds.
693 On the set of axes below, solve the following system of inequalities graphically.

\[ y < 2x + 1 \]
\[ y \geq -\frac{1}{3}x + 4 \]

State the coordinates of a point in the solution set.

694 Using the line provided, construct a box-and-whisker plot for the 12 scores below.

26, 32, 19, 65, 57, 16, 28, 42, 40, 21, 38, 10

Determine the number of scores that lie above the 75th percentile.

695 A bottle contains 12 red marbles and 8 blue marbles. A marble is chosen at random and not replaced. Then, a second marble is chosen at random. Determine the probability that the two marbles are not the same color. Determine the probability that at least one of the marbles is red.

696 The diagram below shows a cumulative frequency histogram of the students' test scores in Ms. Wedow's algebra class.

Determine the total number of students in the class. Determine how many students scored higher than 70. State which ten-point interval contains the median. State which two ten-point intervals contain the same frequency.
697 On the set of axes below, solve the following system of equations graphically for all values of $x$ and $y$.

\[
\begin{align*}
y &= -x^2 - 4x + 12 \\
y &= -2x + 4
\end{align*}
\]

698 On the set of axes below, solve the following system of equations graphically for all values of $x$ and $y$.

\[
\begin{align*}
y &= x^2 - 6x + 1 \\
y + 2x &= 6
\end{align*}
\]
699. On the set of axes below, graph the following system of equations.

\[ y + 2x = x^2 + 4 \]
\[ y - x = 4 \]

Using the graph, determine and state the coordinates of all points in the solution set for the system of equations.

700. On the grid below, solve the system of equations graphically for \( x \) and \( y \).

\[ 4x - 2y = 10 \]
\[ y = -2x - 1 \]
701 The Fahrenheit temperature readings on 30 April mornings in Stormville, New York, are shown below.

41°, 58°, 61°, 54°, 49°, 46°, 52°, 58°, 67°, 43°,
47°, 60°, 52°, 58°, 48°, 44°, 59°, 66°, 62°, 55°,
44°, 49°, 62°, 61°, 59°, 54°, 57°, 58°, 63°, 60°

Using the data, complete the frequency table below.

<table>
<thead>
<tr>
<th>Interval</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>40–44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45–49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50–54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>55–59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60–64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>65–69</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

On the grid below, construct and label a frequency histogram based on the table.

702 Solve the following system of inequalities graphically on the set of axes below.

\[3x + y < 7\]

\[y \geq \frac{2}{3}x - 4\]

State the coordinates of a point in the solution set.
Integrated Algebra Multiple Choice Regents Exam Questions
Answer Section

1 ANS: 2 REF: 061314ia STA: A.S.6 TOP: Box-and-Whisker Plots
2 ANS: 1 REF: 081326ia STA: A.G.1 TOP: Compositions of Polygons and Circles
4(5 + 5) + 10\pi = 40 + 10\pi

3 ANS: 4 REF: 081303ia STA: A.S.22 TOP: Theoretical Probability
4 ANS: 3 REF: 061218ia STA: A.S.20 TOP: Geometric Probability
5 ANS: 1 REF: 081209ia STA: A.N.1 TOP: Properties of Reals
6 ANS: 1 REF: 011207ia STA: A.G.9 TOP: Quadratic-Linear Systems
7 ANS: 4 REF: 081322ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph
8 ANS: 3 REF: 081317ia STA: A.A.21 TOP: Interpreting Solutions
9 ANS: 3 REF: 011324ia STA: A.A.36 TOP: Parallel and Perpendicular Lines
10 ANS: 2 REF: 061229ia STA: A.A.9 TOP: Exponential Functions
11 ANS: 4 REF: 011318ia STA: A.A.29 TOP: Set Theory
12 ANS: 2 REF: 011316ia STA: A.A.14 TOP: Division of Polynomials
13 ANS: 1
\[
\frac{2x^2 + 10x - 28}{4x + 28} = \frac{2(x^2 + 5x - 14)}{4x + 28} = \frac{2(x + 7)(x - 2)}{4(x + 7)} = \frac{x - 2}{2}
\]
REF: 011327ia STA: A.A.16 TOP: Rational Expressions
KEY: a > 0

14 ANS: 1
Using \( m = -\frac{A}{B} \), the slope of \( 2x - 3y = 9 \) is \( \frac{2}{3} \).

15 ANS: 3 REF: 011322ia STA: A.A.38 TOP: Parallel and Perpendicular Lines
16 ANS: 4
\[
\frac{95000}{125000} = 0.76
\]
REF: 061207ia STA: A.S.11 TOP: Quartiles and Percentiles
17 ANS: 4
\[
3y + 2x = 8
\]
\[
3(-2) + 2(7) = 8
\]
\[
-6 + 14 = 8
\]
REF: 011218ia STA: A.A.39 TOP: Identifying Points on a Line
KEY: independent events
18 ANS: 4 REF: 081229ia STA: A.S.23 TOP: Theoretical Probability
KEY: independent events
2(5) + k = 9
10 + k = 9
k = -1

m = \frac{-(-3)}{B} = \frac{3}{2}

3x^3 - 33x^2 + 90x = 3x(x^2 - 11x + 30) = 3x(x - 5)(x - 6)

3x - 27x = 0
3x(x - 9) = 0
x = 0, 9

3 + 2 - 1 = 4

\sqrt{8^2 - 6^2} = \sqrt{28} = \sqrt{4 \cdot 7} = 2\sqrt{7}
32 ANS: 3
\[ b = 3 + d \quad (3 + d)d = 40 \]
\[ bd = 40 \quad d^2 + 3d - 40 = 0 \]
\[ (d + 8)(d - 5) = 0 \]
\[ d = 5 \]

REF: 011208ia STA: A.A.8 TOP: Writing Quadratics

33 ANS: 3
\[ \sqrt{13^2 - 7^2} = \sqrt{120} \]

REF: 081323ia STA: A.A.45 TOP: Pythagorean Theorem

34 ANS: 3
REF: 011220ia STA: A.S.6 TOP: Box-and-Whisker Plots

35 ANS: 4
\[ x^2 - 2x - 15 = 0 \]
\[ (x + 3)(x - 5) = 0 \]
\[ x = -3, 5 \]

REF: 081316ia STA: A.A.15 TOP: Undefined Rationals

36 ANS: 2
REF: 011227ia STA: A.A.3 TOP: Expressions

37 ANS: 2
\[ | -3 - 4 | - (-3)^2 = 7 - 9 = -2 \]

REF: 011321ia STA: A.N.6 TOP: Evaluating Expressions

38 ANS: 2
\[ 2y + 2w = x \]
\[ 2w = x - 2y \]
\[ w = \frac{x - 2y}{2} \]

REF: 081330ia STA: A.A.23 TOP: Transforming Formulas

39 ANS: 3
\[ 6! + \frac{5! (3!)}{4!} - 10 = 720 + 5(6) - 10 = 740 \]

REF: 061309ia STA: A.N.6 TOP: Evaluating Expressions

40 ANS: 3
REF: 011315ia STA: A.G.1 TOP: Compositions of Polygons and Circles

41 ANS: 4
REF: 061320ia STA: A.G.6 TOP: Linear Inequalities

42 ANS: 2
\[ s^3 = 8 \quad 6 \times (2 \times 2) = 24 \]
\[ s = 2 \]

REF: 081325ia STA: A.G.2 TOP: Surface Area
43  ANS: 1  
\[ x^2 + 5x - 6 = 0 \]
\[ (x + 6)(x - 1) = 0 \]
\[ x = -6, 1 \]

REF: 011214ia    STA: A.A.15    TOP: Undefined Rationals

44  ANS: 3  
REF: 061306ia    STA: A.G.8    TOP: Solving Quadratics by Graphing

45  ANS: 4  
\[ \frac{2x^2(x^4 - 9x^2 + 1)}{2x^2} \]

KEY: a > 0

REF: 081222ia    STA: A.A.16    TOP: Rational Expressions

46  ANS: 3  
Due to lack of specificity in the wording, this 13th question was removed from the June, 2013 Regents Exam.

REF: 061313ia    STA: A.S.2    TOP: Analysis of Data

47  ANS: 2  
\[ 13^2 + 13^2 = x^2 \]
\[ 338 = x^2 \]
\[ \sqrt{338} = x \]
\[ 18 \approx x \]

REF: 061223ia    STA: A.A.45    TOP: Pythagorean Theorem

48  ANS: 1  
REF: 011311ia    STA: A.A.2    TOP: Expressions

49  ANS: 4  
REF: 011222ia    STA: A.A.29    TOP: Set Theory

50  ANS: 2  
REF: 081218ia    STA: A.G.5    TOP: Graphing Quadratic Functions

51  ANS: 4  
\[ 5 - 2x = -4x - 7 \]
\[ 2x = -12 \]
\[ x = -6 \]

REF: 011305ia    STA: A.A.22    TOP: Solving Equations

52  ANS: 3  
REF: 061206ia    STA: A.S.2    TOP: Analysis of Data

53  ANS: 1  
REF: 081301ia    STA: A.S.12    TOP: Scatter Plots

54  ANS: 2  
\[ \frac{2y}{y + 5} + \frac{10}{y + 5} = \frac{2y + 10}{y + 5} = \frac{2(y + 5)}{y + 5} = 2 \]

REF: 011230ia    STA: A.A.17    TOP: Addition and Subtraction of Rationals
55 ANS: 2

\[ y = -x + 5 \quad \text{and} \quad -x + 5 = x^2 - 25 \quad \Rightarrow \quad y = -(6) + 5 = 11. \]

\[ 0 = x^2 + x - 30 \quad y = -5 + 5 = 0 \]

\[ 0 = (x + 6)(x - 5) \]

\[ x = -6, 5 \]

REF: 061213ia STA: A.A.11 TOP: Quadratic-Linear Systems

56 ANS: 1

\[ rx - st = r \]
\[ rx = r + st \]
\[ x = \frac{r + st}{r} \]

REF: 061316ia STA: A.A.23 TOP: Transforming Formulas

57 ANS: 4

\[ A = \{1, 3, 5, 7, 9, 11, 13, 15, 17, 19\} \]

REF: 081306ia STA: A.A.30 TOP: Set Theory

58 ANS: 4

\[ m = \frac{-3 - 1}{2 - 5} = \frac{-4}{-3} = \frac{4}{3} \]

REF: 011215ia STA: A.A.33 TOP: Slope

59 ANS: 1

REF: 011306ia STA: A.A.19 TOP: Factoring the Difference of Perfect Squares

60 ANS: 3

\[ N = 5 + J \quad N(N - 5) = 84 \]
\[ J = N - 5 \quad N^2 - 5N - 84 = 0 \]
\[ NJ = 84 \quad (N - 12)(N + 7) = 0 \]

\[ N = 12 \]

REF: 081304ia STA: A.A.8 TOP: Writing Quadratics

61 ANS: 2

REF: 061205ia STA: A.S.12 TOP: Scatter Plots

62 ANS: 1

\[ \sqrt{1700^2 - 1300^2} \approx 1095 \]

REF: 011221ia STA: A.A.45 TOP: Pythagorean Theorem
63 ANS: 1
\[
\frac{3}{4} \times 5 = \frac{15}{4} \text{ teaspoons} \times \frac{1 \text{ tablespoon}}{3 \text{ teaspoons}} = \frac{5}{4} = 1 \frac{1}{4} \text{ tablespoon}
\]

REF: 061228ia STA: A.M.2 TOP: Conversions KEY: dimensional analysis

64 ANS: 3 REF: 011309ia STA: A.G.3 TOP: Defining Functions

65 ANS: 3
\[
\frac{3^6}{3^1} = 3^5
\]

REF: 061219ia STA: A.A.12 TOP: Division of Powers

66 ANS: 4 The transformation is a reflection in the x-axis.

REF: 011206ia STA: A.G.5 TOP: Graphing Absolute Value Functions

67 ANS: 3
\[
2\sqrt{45} = 2\sqrt{9 \cdot 5} = 6\sqrt{5}
\]

REF: 011203ia STA: A.N.2 TOP: Simplifying Radicals

68 ANS: 3 REF: 061230ia STA: A.S.9 TOP: Frequency Histograms, Bar Graphs and Tables

69 ANS: 1
\[
\frac{\text{distance}}{\text{time}} = \frac{350.7}{4.2} = 83.5
\]

REF: 061201ia STA: A.M.1 TOP: Speed

70 ANS: 2
\[
\frac{x + 2}{2} = \frac{4}{x}
\]
\[
x^2 + 2x = 8
\]
\[
x^2 + 2x - 8 = 0
\]
\[
(x + 4)(x - 2) = 0
\]
\[
x = -4, 2
\]

REF: 061317ia STA: A.A.26 TOP: Solving Rationals

71 ANS: 3 REF: 081230ia STA: A.A.23 TOP: Transforming Formulas
\[
\frac{1}{7} + \frac{2x}{3} = \frac{15x - 3}{21}
\]

\[
\frac{14x + 3}{21} = \frac{15x - 3}{21}
\]

\[14x + 3 = 15x - 3\]

\[x = 6\]

REF: 011328ia STA: A.A.25 TOP: Solving Equations with Fractional Expressions

73 ANS: 3 REF: 061225ia STA: A.A.5 TOP: Modeling Equations

74 ANS: 4

\[SA = 2lw + 2hw + 2lh = 2(3)(2.2) + 2(7.5)(2.2) + 2(3)(7.5) = 91.2\]

REF: 081216ia STA: A.G.2 TOP: Surface Area

75 ANS: 1 REF: 081315ia STA: A.A.10 TOP: Solving Linear Systems

76 ANS: 1

\[\left| \frac{4(-6) + 18}{4!} \right| = \left| \frac{-6}{24} \right| = \frac{1}{4}\]

REF: 081220ia STA: A.N.6 TOP: Evaluating Expressions

77 ANS: 4

\[m = \frac{-A}{B} = \frac{-4}{3}\]

REF: 061319ia STA: A.A.37 TOP: Slope

78 ANS: 4 REF: 081321ia STA: A.A.29 TOP: Set Theory

79 ANS: 2

To determine student opinion, survey the widest range of students.

REF: 011313ia STA: A.S.3 TOP: Analysis of Data

80 ANS: 1 REF: 011213ia STA: A.A.13 TOP: Addition and Subtraction of Polynomials

KEY: addition

81 ANS: 2 REF: 081314ia STA: A.G.6 TOP: Linear Inequalities

82 ANS: 1 REF: 081319ia STA: A.N.1 TOP: Identifying Properties

83 ANS: 2 REF: 011330ia STA: A.G.5 TOP: Graphing Quadratic Functions

84 ANS: 3 REF: 081207ia STA: A.A.19 TOP: Factoring the Difference of Perfect Squares

85 ANS: 3

The other situations are qualitative.

REF: 081213ia STA: A.S.1 TOP: Analysis of Data
86 ANS: 2
\[ W + L = 72 \]
\[ W - L = 12 \]
\[ 2W = 84 \]
\[ W = 42 \]

REF: 081227ia STA: A.A.7 TOP: Writing Linear Systems

87 ANS: 2
\[ \frac{20}{3.98} = \frac{180}{x} \]
\[ 20x = 716.4 \]
\[ x = 35.82 \approx 36 \]

REF: 011302ia STA: A.M.1 TOP: Using Rate

88 ANS: 2 REF: 061312ia STA: A.A.12 TOP: Powers of Powers

89 ANS: 4 REF: 061222ia STA: A.A.40 TOP: Systems of Linear Inequalities

90 ANS: 2
People at a gym or football game and members of a soccer team are more biased towards sports.

REF: 061202ia STA: A.S.3 TOP: Analysis of Data

91 ANS: 4
\[
P(\text{odd}) = \frac{7 + 14 + 20}{75} = \frac{41}{75} \quad P(\text{even}) = \frac{22 + 6 + 6}{75} = \frac{34}{75} \quad P(\text{3 or less}) = \frac{14 + 22 + 7}{75} = \frac{43}{75}.
\]

\[
P(2 \text{ or 4}) = \frac{22 + 6}{75} = \frac{28}{75}
\]

REF: 011325ia STA: A.S.22 TOP: Theoretical Probability

92 ANS: 3
\[ \frac{2}{x + 1} = \frac{x + 1}{2} \]
\[ x^2 + 2x + 1 = 4 \]
\[ x^2 + 2x - 3 = 0 \]
\[ (x + 3)(x - 1) = 3 \]
\[ x = -3, 1 \]

REF: 081226ia STA: A.A.26 TOP: Solving Rationals

93 ANS: 3
\[ 0.06y + 200 = 0.03y + 350 \]
\[ 0.03y = 150 \]
\[ y = 5,000 \]

REF: 081203ia STA: A.A.25 TOP: Solving Equations with Decimals

94 ANS: 1 REF: 061301ia STA: A.A.1 TOP: Expressions
95 ANS: 1 REF: 061322ia STA: A.A.13 TOP: Addition and Subtraction of Polynomials
KEY: subtraction
96 ANS: 2 REF: 081305ia STA: A.A.1 TOP: Expressions
97 ANS: 3 REF: 011204ia STA: A.G.3 TOP: Defining Functions
KEY: graphs
98 ANS: 3 REF: 061323ia STA: A.A.1 TOP: Expressions
100 ANS: 2 REF: 081311ia STA: A.A.12 TOP: Division of Powers
101 ANS: 3
\[ A \cap C = \{1, 2, 3, 5, 7, 9\} \]
REF: 081221ia STA: A.A.31 TOP: Set Theory
102 ANS: 3
\[(3x + 2)(x - 7) = 3x^2 - 21x + 2x - 14 = 3x^2 - 19x - 14 \]
REF: 061210ia STA: A.A.13 TOP: Multiplication of Polynomials
103 ANS: 1
\[ x^2 - 5x + 3 = x - 6 \quad y = 3 - 6 = -3 \quad (3, -3) \]
\[ x^2 - 6x + 9 = 0 \]
\[ (x - 3)^2 = 0 \]
\[ x = 3 \]
REF: 061330ia STA: A.G.9 TOP: Quadratic-Linear Systems
104 ANS: 4
\[ \frac{\left(4x^3\right)^2}{2x} = \frac{16x^6}{2x} = 8x^5 \]
REF: 011216ia STA: A.A.12 TOP: Powers of Powers
105 ANS: 3 REF: 081208ia STA: A.S.17 TOP: Scatter Plots
106 ANS: 2
The other sets of data are qualitative.
REF: 011211ia STA: A.S.1 TOP: Analysis of Data
107 ANS: 4
If \( m \angle C = 90 \), then \( AB \) is the hypotenuse, and the triangle is a 3-4-5 triangle.
REF: 061224ia STA: A.A.42 TOP: Trigonometric Ratios
108 ANS: 1
\[-3x + 8 \geq 14 \]
\[-3x \geq 6 \]
\[ x \leq -2 \]
REF: 081309ia STA: A.A.21 TOP: Interpreting Solutions
109 ANS: 4
\[ 375 + 155w \geq 900 \]
\[ 155w \geq 525 \]
\[ w \geq 3.4 \]

REF: 081206ia STA: A.A.6 TOP: Modeling Inequalities

110 ANS: 2
\[-1 \leq 3(2) + 1, \quad 2 - (-1) > 1 \]
\[-1 \leq 7, \quad 3 > 1 \]

REF: 011323ia STA: A.A.40 TOP: Systems of Linear Inequalities

111 ANS: 2
REF: 061327ia STA: A.A.36 TOP: Parallel and Perpendicular Lines

112 ANS: 3
\[ y = mx + b \]
\[ y = \frac{3}{4}x - \frac{1}{2} \]
\[ 1 = \left(\frac{3}{4}\right)(2) + b \]
\[ 4y = 3x - 2 \]
\[ 1 = \frac{3}{2} + b \]
\[ b = -\frac{1}{2} \]

REF: 081219ia STA: A.A.34 TOP: Writing Linear Equations

113 ANS: 2
\[ \cos x = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{16}{20} \]

REF: 011307ia STA: A.A.42 TOP: Trigonometric Ratios

114 ANS: 1
\[ m = -3 \]

REF: 081307ia STA: A.A.38 TOP: Parallel and Perpendicular Lines

115 ANS: 2
\[ \left| \frac{(2.6 \times 6.9) - (2.5 \times 6.8)}{(2.6 \times 6.9)} \right| \approx 0.052 \]

REF: 011209ia STA: A.M.3 TOP: Error KEY: area

116 ANS: 1
\[ \frac{20 - 6}{(20 - 6) + 15 + 7 + 8} = \frac{14}{44} \]

REF: 061302ia STA: A.S.18 TOP: Conditional Probability

117 ANS: 1 REF: 061315ia STA: A.A.15 TOP: Undefined Rationals

118 ANS: 3 REF: 081211ia STA: A.A.9 TOP: Exponential Functions

119 ANS: 4 REF: 081312ia STA: A.S.6 TOP: Box-and-Whisker Plots
Identifying the Vertex of a Quadratic Given Graph

\[ x^2 - 14x + 48 = 0 \]
\[(x - 6)(x - 8) = 0\]
\[x = 6, 8\]

Roots of Quadratics

The other situations are quantitative.

Analysis of Data

\[ \frac{120}{60} = \frac{m}{150} \]
\[m = 300\]

Using Rate

Using Trigonometry to Find an Angle
135 ANS: 1
\[ k = am + 3mx \]
\[ k = m(a + 3x) \]
\[ \frac{k}{a + 3x} = m \]

REF: 061215ia STA: A.A.23 TOP: Transforming Formulas

136 ANS: 2
\[ x^2 - 16x + 28 = 0 \]
\[ (x - 14)(x - 2) = 0 \]
\[ x = 14, 2 \]

REF: 061311ia STA: A.A.27 TOP: Solving Quadratics by Factoring

137 ANS: 2
\[ m = \frac{-7 - 1}{4 - 9} = \frac{-8}{-5} = \frac{8}{5} \]

REF: 081310ia STA: A.A.33 TOP: Slope

138 ANS: 3
\[ x = \frac{-b}{2a} = \frac{-24}{2(-2)} = 6. \quad y = -2(6)^2 + 24(6) - 100 = -28 \]

REF: 061214ia STA: A.A.41 TOP: Identifying the Vertex of a Quadratic Given Equation

139 ANS: 1 REF: 011202ia STA: A.A.9 TOP: Exponential Functions

140 ANS: 2 REF: 081205ia STA: A.A.13 TOP: Addition and Subtraction of Polynomials
KEY: addition

141 ANS: 1 REF: 061220ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

142 ANS: 3
\[ \tan PLM = \frac{\text{opposite}}{\text{adjacent}} = \frac{4}{3} \]

REF: 011226ia STA: A.A.42 TOP: Trigonometric Ratios

143 ANS: 2
\[ \frac{x^2 - 3x - 10}{x^2 - 25} = \frac{(x - 5)(x + 2)}{(x + 5)(x - 5)} = \frac{x + 2}{x + 5} \]

REF: 061216ia STA: A.A.16 TOP: Rational Expressions
KEY: \( a > 0 \)

144 ANS: 1 REF: 011303ia STA: A.A.1 TOP: Expressions
145 \begin{align*}
s &= \frac{2x + t}{r} \\
rs &= 2x + t \\
rs - t &= 2x \\
\frac{rs - t}{2} &= x
\end{align*}

REF: 011228ia STA: A.A.23 TOP: Transforming Formulas

146 ANS: 2 REF: 081327ia STA: A.S.16 TOP: Central Tendency

147 ANS: 4

\begin{align*}
V &= \pi r^2 h \\
32\pi &= \pi (2)^2 \\
16 &= r^2 \\
4 &= r
\end{align*}

REF: 081224ia STA: A.G.2 TOP: Volume

148 ANS: 1 KEY: addition

149 ANS: 1

\[
\cos A = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{3}{5}
\]

REF: 081329ia STA: A.A.42 TOP: Trigonometric Ratios

150 ANS: 2 REF: 061326ia STA: A.A.28 TOP: Roots of Quadratics

151 ANS: 4 REF: 061321ia STA: A.A.5 TOP: Modeling Inequalities

152 ANS: 3 REF: 061303ia STA: A.S.17 TOP: Scatter Plots

153 ANS: 2 REF: 011212ia STA: A.S.23 TOP: Theoretical Probability

KEY: independent events

154 ANS: 3 REF: 011205ia STA: A.A.1 TOP: Expressions

155 ANS: 1

\[
\frac{(x + 5)(x + 3)}{x + 5} = x + 3
\]

REF: 0613071a STA: A.A.16 TOP: Rational Expressions

KEY: \(a > 0\)

156 ANS: 3

\[
x < 11
\]

REF: 061211ia STA: A.A.6 TOP: Modeling Inequalities
157 ANS: 4

\[ 8900 \text{ ft} \times \frac{1 \text{ mi}}{5280 \text{ ft}} \approx 1.7 \text{ mi} \]

REF: 081210ia STA: A.M.2 TOP: Conversions KEY: dimensional analysis

158 ANS: 2

REF: 081223ia STA: A.A.32 TOP: Slope

159 ANS: 1

REF: 011210ia STA: A.G.6 TOP: Linear Inequalities

160 ANS: 3

\[ \frac{4}{3a} - \frac{5}{2a} = \frac{8}{6a} - \frac{15}{6a} = \frac{-7}{6a} \]

REF: 081328ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

161 ANS: 4

REF: 011229ia STA: A.S.8 TOP: Scatter Plots

162 ANS: 3

REF: 061217ia STA: A.A.29 TOP: Set Theory

163 ANS: 1

\[ x = \frac{-b}{2a} = \frac{-(-3)}{2(2)} = \frac{3}{4} \]

REF: 011219ia STA: A.A.41 TOP: Identifying the Vertex of a Quadratic Given Equation

164 ANS: 3

REF: 011317ia STA: A.M.2 TOP: Conversions

KEY: dimensional analysis

165 ANS: 3

\[ _{18}P_3 = 4896 \]

REF: 061328ia STA: A.N.8 TOP: Permutations

166 ANS: 4

REF: 061203ia STA: A.A.14 TOP: Division of Polynomials

167 ANS: 4

\[ 2(2) - (-7) = 11 \]

REF: 081217ia STA: A.A.39 TOP: Identifying Points on a Line

168 ANS: 3

\[ x^2 - 4 = 0 \]

\[ (x + 2)(x - 2) = 0 \]

\[ x = \pm 2 \]

REF: 081225ia STA: A.A.15 TOP: Undefined Rationals

169 ANS: 4

\[ 5.5 \text{ g} \times \frac{4 \text{ q}}{1 \text{ g}} \times \frac{32 \text{ oz}}{1 \text{ q}} = 704 \text{ oz} \]

REF: 061305ia STA: A.M.2 TOP: Conversions KEY: dimensional analysis

170 ANS: 3

REF: 011304ia STA: A.G.7 TOP: Solving Linear Systems

171 ANS: 4

REF: 011308ia STA: A.S.18 TOP: Conditional Probability

172 ANS: 1

REF: 081204ia STA: A.S.12 TOP: Scatter Plots

173 ANS: 2

REF: 081212ia STA: A.A.5 TOP: Modeling Inequalities
174 ANS: 2
\[ A = \{4, 9, 16, 25, 36, 49, 64, 81, 100\} \]

REF: 011326ia STA: A.A.30 TOP: Set Theory

175 ANS: 3
\[ (2, T), (4, T), (6, T) \]

REF: 081324ia STA: A.S.19 TOP: Sample Space

176 ANS: 3

REF: 061318ia STA: A.G.4 TOP: Families of Functions

177 ANS: 1
\[ 4 + 6 + 10 + \frac{6\pi}{2} = 20 + 3\pi \]

REF: 081228ia STA: A.G.1 TOP: Compositions of Polygons and Circles

KEY: perimeter
Integrated Algebra Multiple Choice Regents Exam Questions
Answer Section

178 ANS: 2

\[
\frac{2x - 3}{x - 4} = \frac{2}{3}
\]

3(2x - 3) = 2(x - 4)

6x - 9 = 2x - 8

4x = 1

x = \frac{1}{4}

REF: 081012ia STA: A.A.26 TOP: Solving Rationals

179 ANS: 3

75 - 15 = 60

REF: 011113ia STA: A.S.6 TOP: Box-and-Whisker Plots

180 ANS: 2

\[
\frac{13.5 - 12.8}{13.5} \approx 0.093
\]

REF: 081123ia STA: A.M.3 TOP: Error KEY: area

181 ANS: 1

REF: 011004ia STA: A.A.31 TOP: Set Theory

182 ANS: 2

REF: 011005ia STA: A.A.5 TOP: Modeling Inequalities

183 ANS: 2

shaded = whole - unshaded

= rectangle-triangle

= lw - \frac{1}{2} bh

= 15 \times 6 - \frac{1}{2} \times 15 \times 4.6

= 90 - 34.5

= 55.5

REF: 081019ia STA: A.G.1 TOP: Compositions of Polygons and Circles KEY: area
axis of symmetry: $x = \frac{-b}{2a} = \frac{-2}{2(1)} = -1$

$2y = 2x + 10$

$y = x + 5$

$P(O) = \frac{5}{10}, P(P) = \frac{4}{10}, P(\leq 5) = \frac{6}{10}, P(/3) = \frac{4}{10}$

The other situations are quantitative.

$\sin x = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{28}{53}$

$\frac{2 + 3 + 0 + 1 + 3 + 2 + 4 + 0 + 2 + 3}{10} = \frac{20}{10} = 2 \cdot \frac{x}{10} = 2 + 0.5$

$x = 25$

$\frac{150}{20} = \frac{x}{30}$

$20x = 4500$

$x = 225$
196 \text{ ANS: 2 } \\
\frac{m}{B} = \frac{-A}{B} = \frac{-3}{-7} = \frac{3}{7} \\
\text{REF: 011122ia STA: A.A.37 TOP: Slope} \\
197 \text{ ANS: 2} \\
A = lw + lw + \frac{\pi r^2}{4} = 5 \cdot 3 + 5 \cdot 3 + \frac{\pi \cdot 3^2}{4} \approx 37 \\
\text{REF: 011123ia STA: A.G.1 TOP: Compositions of Polygons and Circles} \\
\text{KEY: area} \\
198 \text{ ANS: 1} \\
\text{Asking school district employees about a school board candidate produces the most bias.} \\
\text{REF: 061107ia STA: A.S.3 TOP: Analysis of Data} \\
199 \text{ ANS: 4} \\
\text{REF: 061022ia STA: A.S.3 TOP: Analysis of Data} \\
200 \text{ ANS: 3} \\
\frac{15}{15 + 13 + 12} = \frac{15}{40} = \frac{3}{8} \\
\text{REF: 061006ia STA: A.S.21 TOP: Experimental Probability} \\
201 \text{ ANS: 4} \\
\frac{7}{12x} - \frac{y}{6x^2} = \frac{42x^2 - 12xy}{72x^3} = \frac{6x(7x - 2y)}{72x^3} = \frac{7x - 2y}{12x^2} \\
\text{REF: 061129ia STA: A.A.17 TOP: Addition and Subtraction of Rationals} \\
202 \text{ ANS: 4} \\
A(-3,4) \text{ and } B(5,8). \ m = \frac{4 - 8}{-3 - 5} = \frac{-4}{-8} = \frac{1}{2} \\
\text{REF: 011007ia STA: A.A.33 TOP: Slope} \\
203 \text{ ANS: 3} \\
\text{REF: 081017a STA: A.S.14 TOP: Analysis of Data} \\
204 \text{ ANS: 2} \\
2000(1 + 0.04)^3 \approx 2249 \\
\text{REF: 081124ia STA: A.A.9 TOP: Exponential Functions} \\
205 \text{ ANS: 2} \\
\text{REF: 061115ia STA: A.S.7 TOP: Scatter Plots} \\
206 \text{ ANS: 2} \\
\text{REF: 061023ia STA: A.A.23 TOP: Transforming Formulas} \\
207 \text{ ANS: 4} \\
\text{REF: 011114ia STA: A.N.1 TOP: Properties of Reals} \\
208 \text{ ANS: 3} \\
\text{REF: 061003ia STA: A.A.13 TOP: Addition and Subtraction of Polynomials} \\
\text{KEY: addition} \\
209 \text{ ANS: 1} \\
\text{REF: 081110ia STA: A.A.1 TOP: Expressions} \\
3
\[ \tan A = \frac{\text{opposite}}{\text{adjacent}} = \frac{14}{48} \]

REF: 061009ia STA: A.A.42 TOP: Trigonometric Ratios

211 ANS: 3 REF: 011104ia STA: A.A.1 TOP: Expressions

212 ANS: 2
\[ m = \frac{5 - 2}{3 - (-2)} = \frac{3}{5} \]

REF: 061004ia STA: A.A.33 TOP: Slope

213 ANS: 2 REF: 011119ia STA: A.A.29 TOP: Set Theory

214 ANS: 4 REF: 061018ia STA: A.A.12 TOP: Division of Powers

215 ANS: 4

The other sets of data are qualitative.

REF: 011116ia STA: A.S.1 TOP: Analysis of Data

216 ANS: 4
\[ s = \frac{d}{t} = \frac{150 \text{ m}}{1.5 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} = 6,000 \frac{\text{m}}{\text{hr}} \]

REF: 061025ia STA: A.M.1 TOP: Speed

217 ANS: 4
\[-6x - 17 \geq 8x + 25 \]
\[-42 \geq 14x \]
\[-3 \geq x \]

REF: 081121ia STA: A.A.24 TOP: Solving Inequalities

218 ANS: 3
\[ \frac{12x^3 - 6x^2 + 2x}{2x} = \frac{2x(6x^2 - 3x + 1)}{2x} = 6x^2 - 3x + 1 \]

REF: 011011ia STA: A.A.14 TOP: Division of Polynomials

219 ANS: 1
\[ \frac{6}{7} = 21,600. \quad 21,600 - 15,000 = 6,600 \]

REF: 061030ia STA: A.A.9 TOP: Exponential Functions

220 ANS: 3
\[ c + 3d = 8 \quad c = 4d - 6 \]
\[ 4d - 6 + 3d = 8 \quad c = 4(2) - 6 \]
\[ 7d = 14 \quad c = 2 \]
\[ d = 2 \]

REF: 061012ia STA: A.A.10 TOP: Solving Linear Systems
221 ANS: 4 REF: 081022ia STA: A.A.29 TOP: Set Theory
222 ANS: 2 REF: 061027ia STA: A.A.20 TOP: Factoring Polynomials
223 ANS: 4
SA = 2lh + 2hw + 2lh = 2(2)(3) + 2(4)(3) + 2(2)(4) = 52
REF: 011029ia STA: A.G.2 TOP: Surface Area
224 ANS: 1 REF: 011101ia STA: A.A.31 TOP: Set Theory
225 ANS: 2
l(l - 3) = 40
l^2 - 3l - 40 = 0
(l - 8)(l + 5) = 0
l = 8
REF: 081116ia STA: A.A.8 TOP: Geometric Applications of Quadratics
226 ANS: 2
\[ \frac{55.42 - 50.27}{55.42} \approx 0.093 \]
REF: 081023ia STA: A.M.3 TOP: Error KEY: area
227 ANS: 2
A = lw + \frac{\pi r^2}{2} = 6 \cdot 5 + \frac{\pi \cdot 3^2}{2} \approx 44.1
REF: 061029ia STA: A.G.1 TOP: Compositions of Polygons and Circles KEY: area
228 ANS: 3
P(S) \cdot P(M) = P(S and M)
\[ \frac{3}{5} \cdot P(M) = \frac{3}{10} \]
P(M) = \frac{1}{2}
REF: 081024ia STA: A.S.23 TOP: Theoretical Probability KEY: independent events
229 ANS: 2
R = 0.5^{d-1}
REF: 011006ia STA: A.A.9 TOP: Exponential Functions
230 ANS: 3 REF: 061119ia STA: A.A.2 TOP: Expressions
\[
\frac{x + 2}{x - 2} = \frac{-3}{x}
\]
\[x(x + 2) = -3(x - 2)\]
\[x^2 + 2x = -3x + 6\]
\[x^2 + 5x - 6 = 0\]
\[(x + 6)(x - 1) = 0\]
\[x = -6 \text{ or } 1\]

REF: 011028ia STA: A.A.26 TOP: Solving Rationals

\[\sqrt{5^2 + 7^2} \approx 8.6\]

REF: 081004ia STA: A.A.45 TOP: Pythagorean Theorem

\[\frac{ey}{n} + k = t\]
\[\frac{ey}{n} = t - k\]
\[y = \frac{n(t - k)}{e}\]

REF: 011125ia STA: A.A.23 TOP: Transforming Formulas

\[20000(0.88)^3 = 13629.44\]

REF: 061124ia STA: A.A.9 TOP: Exponential Functions

KEY: graphs

REF: 061013ia STA: A.G.3 TOP: Defining Functions

\[y = mx + b\]
\[5 = (-2)(1) + b\]
\[b = 7\]

REF: 061114ia STA: A.A.43 TOP: Using Trigonometry to Find an Angle

REF: 081108ia STA: A.A.34 TOP: Writing Linear Equations

REF: 061105ia STA: A.A.20 TOP: Factoring Polynomials
\[ \sqrt{72} - 3\sqrt{2} = \sqrt{36\cdot 2} - 3\sqrt{2} = 6\sqrt{2} - 3\sqrt{2} = 3\sqrt{2} \]

**REF:** 061008ia  **STA:** A.N.3  **TOP:** Operations with Radicals  
**KEY:** subtraction

\[ 7 + 8 + 7 + \frac{12\pi}{2} = 22 + 6\pi \]

**REF:** 081128ia  **STA:** A.G.1  **TOP:** Compositions of Polygons and Circles  
**KEY:** perimeter

\[ x^2 - 2x - 15 = 0 \]
\[ (x - 5)(x + 3) = 0 \]
\[ x = 5 \quad x = -3 \]

**REF:** 011128ia  **STA:** A.A.28  **TOP:** Roots of Quadratics

In (4), each element in the domain corresponds to a unique element in the range.

**REF:** 011105ia  **STA:** A.G.3  **TOP:** Defining Functions  
**KEY:** ordered pairs

\[ 6 - 4 \]
\[ 3 \cdot (-2) \]
\[ \frac{2}{5} \]

**REF:** 061110ia  **STA:** A.A.33  **TOP:** Slope

Debbie failed to distribute the 3 properly.

**REF:** 011009ia  **STA:** A.A.22  **TOP:** Solving Equations

\[ 6 - 4 \]
\[ 3 \cdot (-2) \]
\[ \frac{2}{5} \]

**REF:** 061001ia  **STA:** A.A.30  **TOP:** Set Theory
\[
\frac{x^2 - x - 6}{x^2 - 5x + 6} = \frac{(x - 3)(x + 2)}{(x - 3)(x + 2)} = \frac{x + 2}{x - 2}
\]

REF: 011130ia STA: A.A.16 TOP: Rational Expressions
KEY: a > 0

253 ANS: 2
\[A(-3, 8) \text{ and } B(3, 6). \quad m = \frac{8 - 6}{-3 - 3} = \frac{2}{-6} = -\frac{1}{3}\]

REF: 081005ia STA: A.A.33 TOP: Slope

254 ANS: 2
\[\sqrt{18.4^2 - 7^2} \approx 17\]

REF: 011107ia STA: A.A.45 TOP: Pythagorean Theorem

255 ANS: 4 REF: 011025ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

256 ANS: 2
\[\cos 38 = \frac{10}{x}\]
\[x = \frac{10}{\cos 38} \approx 12.69\]

REF: 081126ia STA: A.A.44 TOP: Using Trigonometry to Find a Side

257 ANS: 4 REF: 011111ia STA: A.G.8 TOP: Solving Quadratics by Graphing

258 ANS: 4 REF: 061016ia STA: A.A.2 TOP: Expressions

259 ANS: 4
\[6\sqrt{50} + 6\sqrt{2} = 6\sqrt{25 \times 2} + 6\sqrt{2} = 30\sqrt{2} + 6\sqrt{2} = 36\sqrt{2}\]

REF: 011024ia STA: A.N.3 TOP: Operations with Radicals
KEY: addition

260 ANS: 3
Frequency is not a variable.

REF: 011014ia STA: A.S.2 TOP: Analysis of Data

261 ANS: 4
\[5 \times 2 \times 3 = 30\]

REF: 061002ia STA: A.N.7 TOP: Multiplication Counting Principle

262 ANS: 2 REF: 011015ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph

263 ANS: 1
\[x = \frac{-b}{2a} = \frac{-6}{2(-1)} = 3.\]

REF: 011127ia STA: A.A.41 TOP: Identifying the Vertex of a Quadratic Given Equation

264 ANS: 4 REF: 081107ia STA: A.A.5 TOP: Modeling Inequalities
265 ANS: 4 REF: 081025ia STA: A.G.4 TOP: Families of Functions
266 ANS: 2
\[ m = \frac{5-3}{8-1} = \frac{2}{7} \quad y - y_1 = m(x - x_1) \]
\[ y - 5 = \frac{2}{7}(x - 8) \]
REF: 081029ia STA: A.A.35 TOP: Writing Linear Equations

267 ANS: 1
The slope of \(2x - 4y = 16\) is \(\frac{-4}{B} = \frac{-2}{-4} = \frac{1}{2}\)
REF: 011026ia STA: A.A.38 TOP: Parallel and Perpendicular Lines

268 ANS: 3
\[ \frac{2+x}{5x} - \frac{x-2}{5x} = \frac{2+x-x+2}{5x} = \frac{4}{5x} \]
REF: 081027ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

269 ANS: 3 REF: 011017ia STA: A.G.5 TOP: Graphing Absolute Value Functions
270 ANS: 4 REF: 011016ia STA: A.A.23 TOP: Transforming Formulas
271 ANS: 2 REF: 011022ia STA: A.A.19 TOP: Factoring the Difference of Perfect Squares

272 ANS: 2 REF: 061113ia STA: A.G.5 TOP: Graphing Quadratic Functions
273 ANS: 2 REF: 011023ia STA: A.A.40 TOP: Systems of Linear Inequalities

274 ANS: 3
\[ \frac{x}{3} + \frac{x+1}{2} = x \]
\[ \frac{2x+3(x+1)}{6} = x \]
\[ 5x + 3 = 6x \]
\[ 3 = x \]
REF: 061019ia STA: A.A.25 TOP: Solving Equations with Fractional Expressions

275 ANS: 3
\[ x = \frac{-b}{2a} = \frac{-8}{2(1)} = -4, y = (-4)^2 + 8(-4) + 10 = -6 \]
\( (-4, -6) \)
REF: 011314ia STA: A.A.41 TOP: Identifying the Vertex of a Quadratic Given Equation

276 ANS: 4
In (4), each element in the domain corresponds to a unique element in the range.

277 ANS: 2 REF: 081014ia STA: A.A.36 TOP: Parallel and Perpendicular Lines

278 ANS: 1 REF: 081102ia STA: A.S.12 TOP: Scatter Plots
279 ANS: 4
\[ 5 \times 4 \times 3 \times 2 \times 1 = 120 \]

REF: 061109ia STA: A.N.8 TOP: Permutations

280 ANS: 2
REF: 011002ia STA: A.S.20 TOP: Theoretical Probability

281 ANS: 2
REF: 081127ia STA: A.A.40 TOP: Systems of Linear Inequalities

282 ANS: 1
\[ 3(2m - 1) \leq 4m + 7 \]
\[ 6m - 3 \leq 4m + 7 \]
\[ 2m \leq 10 \]
\[ m \leq 5 \]

REF: 081002ia STA: A.A.24 TOP: Solving Inequalities

283 ANS: 2
\[ \frac{3}{2x} + \frac{7}{4x} = \frac{12x + 14x}{8x^2} = \frac{26x}{8x^2} = \frac{13}{4x} \]

REF: 011120ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

284 ANS: 4
REF: 061111ia STA: A.G.4 TOP: Families of Functions

285 ANS: 3
\[ 3 \sqrt{250} = 3 \sqrt{25 \times 10} = 15 \sqrt{10} \]

REF: 061106ia STA: A.N.2 TOP: Simplifying Radicals

286 ANS: 2
\[ \tan B = \frac{\text{opposite}}{\text{adjacent}} = \frac{8}{15} \approx 0.53 \]

REF: 081026ia STA: A.A.42 TOP: Trigonometric Ratios

287 ANS: 3
\[ P(\text{odd}) = \frac{3}{6}, P(\text{prime}) = \frac{3}{6}, P(\text{perfect square}) = \frac{2}{6}, P(\text{even}) = \frac{3}{6} \]

REF: 061104ia STA: A.S.22 TOP: Geometric Probability

288 ANS: 4
REF: 061130ia STA: A.A.13 TOP: Addition and Subtraction of Polynomials

KEY: subtraction

289 ANS: 3
\[ \text{mean} = 81 \frac{7}{11}, \text{median} = 81 \text{ and mode} = 76 \]

REF: 011118ia STA: A.S.4 TOP: Central Tendency

290 ANS: 4
REF: 081011ia STA: A.A.5 TOP: Modeling Equations
291  ANS: 1
\[ x^2 - 36 = 5x \]
\[ x^2 - 5x - 36 = 0 \]
\[ (x - 9)(x + 4) = 0 \]
\[ x = 9 \]

REF: 061020ia  STA: A.A.8  TOP: Writing Quadratics

292  ANS: 4
\[ gP_3 = 336 \]

REF: 061026ia  STA: A.N.8  TOP: Permutations

293  ANS: 1  REF: 061024ia  STA: A.A.17  TOP: Addition and Subtraction of Rationals

294  ANS: 2  REF: 081003ia  STA: A.A.31  TOP: Set Theory

295  ANS: 2  REF: 061128ia  STA: A.A.29  TOP: Set Theory

296  ANS: 1
\[ -|a - b| = -|7 - (-3)| = -|10| = -10 \]

REF: 011010ia  STA: A.N.6  TOP: Evaluating Expressions

297  ANS: 4
\[ 2x - 3y = 9 \]
\[ 2(0) - 3(-3) = 9 \]
\[ 0 + 9 = 9 \]

REF: 081016ia  STA: A.A.39  TOP: Identifying Points on a Line

298  ANS: 1  REF: 011126ia  STA: A.A.39  TOP: Identifying Points on a Line
KEY: subtraction

299  ANS: 3  REF: 061017ia  STA: A.S.11  TOP: Quartiles and Percentiles

300  ANS: 1
\[ 4y - 2x = 0 \]
\[ 4(-1) - 2(-2) = 0 \]
\[ -4 + 4 = 0 \]

REF: 011021ia  STA: A.A.39  TOP: Identifying Points on a Line

301  ANS: 3
\[ 10^2 + 10^2 = c^2 \]
\[ c^2 = 200 \]
\[ c \approx 14.1 \]

REF: 061102ia  STA: A.A.45  TOP: Pythagorean Theorem

302  ANS: 3  REF: 081103ia  STA: A.A.30  TOP: Set Theory
$x^2 - x = x + 3$. Since $y = x + 3$, the solutions are $(3, 6)$ and $(-1, 2)$.

$x^2 - 2x - 3 = 0$

$(x - 3)(x + 1) = 0$

$x = 3$ or $-1$

Candidate $B$ received 45%. $45\% \times 1860 = 837$

$2x - 5y = 11 \quad 2x - 5(-1) = 11$

$-2x + 3y = -9 \quad 2x = 6$

$-2y = 2 \quad x = 3$

$y = -1$

$3\sqrt{2} + \sqrt{8} = 3\sqrt{2} + \sqrt{4} \sqrt{2} = 3\sqrt{2} + 2\sqrt{2} = 5\sqrt{2}$

The age of a child does not cause the number of siblings he has, or vice versa.
\[
\frac{2x}{3} + \frac{1}{2} = \frac{5}{6}
\]

\[
\frac{2x}{3} - \frac{1}{3}
\]

\[6x = 3\]

\[x = \frac{1}{2}\]

REF: 011112ia STA: A.A.25 TOP: Solving Equations with Fractional Expressions

\[\frac{10^3}{5^3} = \frac{1000}{125} = 8\]

REF: 011312ia STA: A.G.2 TOP: Volume

\[b = 2j + 4\]

\[2j + 4 = 31 - j\]

\[b + j = 31\]

\[3j = 27\]

\[b = 31 - j\]

\[j = 9\]

REF: 081119ia STA: A.A.7 TOP: Writing Linear Systems

\[f + m = 53\]

\[f - m = 25\]

\[2m = 28\]

\[m = 14\]

REF: 061126ia STA: A.A.7 TOP: Writing Linear Systems

\[J - M = 3\]

\[8J + 8M = 120\]

\[8J - 8M = 24\]

\[16J = 144\]

\[J = 9\]

REF: 011115ia STA: A.A.7 TOP: Writing Linear Systems

\[J = 9\]

REF: 081106ia STA: A.S.6 TOP: Box-and-Whisker Plots
\[ m = \frac{7 - 3}{3 - 3} = \frac{4}{-6} = -\frac{2}{3} \quad y = mx + b \]
\[ 3 = -\frac{2}{3} (3) + b \]
\[ 3 = -2 + b \]
\[ 5 = b \]

REF: 011013ia STA: A.A.35 TOP: Writing Linear Equations

324 ANS: 4
\[
\frac{9.2 \times 10^6}{2.3 \times 10^2} = 4 \times 10^4
\]

REF: 081006ia STA: A.N.4 TOP: Operations with Scientific Notation

325 ANS: 3
\[
\frac{3 + 2 + 4 + 3}{20} = \frac{12}{20}
\]

REF: 011129ia STA: A.S.21 TOP: Experimental Probability

326 ANS: 4
REF: 011102ia STA: A.G.9 TOP: Quadratic-Linear Systems

327 ANS: 1
REF: 061103ia STA: A.A.12 TOP: Division of Powers

328 ANS: 4
\[ 5(x + 4) = 5x + 20 \]

REF: 081013ia STA: A.A.1 TOP: Expressions

329 ANS: 2
\[
\tan A = \frac{\text{opposite}}{\text{adjacent}} = \frac{5}{12}
\]

REF: 081112ia STA: A.A.42 TOP: Trigonometric Ratios

330 ANS: 1
REF: 081015ia STA: A.G.5 TOP: Graphing Quadratic Functions

331 ANS: 2
REF: 061121ia STA: A.A.3 TOP: Expressions

332 ANS: 4
REF: 061112ia STA: A.A.36 TOP: Parallel and Perpendicular Lines

333 ANS: 2
\[ 36x^2 - 100y^6 = 4(9x^2 - 25y^6) = 4(3x + 5y^3)(3x - 5y^3) \]

REF: 081129ia STA: A.A.19 TOP: Factoring the Difference of Perfect Squares

334 ANS: 3
REF: 011103ia STA: A.S.12 TOP: Scatter Plots

335 ANS: 3
\[
\frac{(12.3 \times 11.9) - (12.2 \times 11.8)}{12.3 \times 11.9} \approx 0.0165
\]

REF: 061120ia STA: A.M.3 TOP: Error KEY: area
\[ \sin 57 = \frac{x}{8} \]
\[ x \approx 6.7 \]

REF: 061108ia STA: A.A.44 TOP: Using Trigonometry to Find a Side

337 ANS: 1
\[ 2(x - 4) = 4(2x + 1) \]
\[ 2x - 8 = 8x + 4 \]
\[ -12 = 6x \]
\[ -2 = x \]

REF: 011106ia STA: A.A.22 TOP: Solving Equations

338 ANS: 3 REF: 081001ia STA: A.S.7 TOP: Scatter Plots

339 ANS: 3
\[ \frac{(10w^5)^2}{5w} = \frac{100w^6}{5w} = 20w^5 \]

REF: 011124ia STA: A.A.12 TOP: Powers of Powers

340 ANS: 1
\[ 1P + 2C = 5 \]
\[ 1P + 4C = 6 \]
\[ 2C = 1 \]
\[ C = 0.5 \]

REF: 011003ia STA: A.A.7 TOP: Writing Linear Systems

341 ANS: 3 REF: 081117ia STA: A.A.29 TOP: Set Theory

342 ANS: 4 REF: 061123ia STA: A.A.31 TOP: Set Theory

343 ANS: 3
\[ \cos A = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{15}{17} \]

REF: 011008ia STA: A.A.42 TOP: Trigonometric Ratios

344 ANS: 3
\[ \sum P_4 = 360 \]

REF: 081028ia STA: A.N.8 TOP: Permutations

345 ANS: 4
\[ \frac{x}{x+4} + \frac{2x}{x^2-16} = \frac{x}{x+4} \cdot \frac{x^2-16}{2x} = \frac{1}{x+4} \cdot \frac{(x+4)(x-4)}{2} = \frac{x-4}{2} \]

REF: 081130ia STA: A.A.18 TOP: Multiplication and Division of Rationals

KEY: division
346 ANS: 2
\[ y - kx = 7 \text{ may be rewritten as } y = kx + 7 \]
REF: 061015ia STA: A.A.38 TOP: Parallel and Perpendicular Lines

347 ANS: 2
REF: 081111ia STA: A.G.10
TOP: Identifying the Vertex of a Quadratic Given Graph

348 ANS: 3
\[ x^2 - 9 = 0 \]
\[ (x + 3)(x - 3) = 0 \]
\[ x = \pm 3 \]
REF: 061014ia STA: A.A.15 TOP: Undefined Rationals

349 ANS: 3
\[ 2(1)+3=5 \]
REF: 061007ia STA: A.A.39 TOP: Linear Equations

350 ANS: 2
\[ x^2 - 5x + 6 = 0 \]
\[ (x - 3)(x - 2) = 0 \]
\[ x = 3 \quad x = 2 \]
REF: 081120ia STA: A.A.28 TOP: Roots of Quadratics

351 ANS: 3
\[ x = \frac{-b}{2a} = \frac{-10}{2(-1)} = 5. \]
REF: 081018ia STA: A.A.41 TOP: Identifying the Vertex of a Quadratic Given Equation

352 ANS: 2
In (2), each element in the domain corresponds to a unique element in the range.
REF: 061116ia STA: A.G.3 TOP: Defining Functions
KEY: ordered pairs

353 ANS: 3
\[ V = \pi r^2 h = \pi \cdot 5^2 \cdot 2.3 \approx 180.6 \]
REF: 081105ia STA: A.G.2 TOP: Volume

354 ANS: 1
REF: 061010ia STA: A.A.40 TOP: Systems of Linear Inequalities

355 ANS: 4
\[ x^2 - 4x - 12 = 0 \]
\[ (x - 6)(x + 2) = 0 \]
\[ x = 6 \quad x = -2 \]
REF: 061125ia STA: A.A.15 TOP: Undefined Rationals
\[
-3(-4)^2(2) + 4(-4) = -96 - 16 = -112
\]

ANS: 1  REF: 081113ia  STA: A.N.6  TOP: Evaluating Expressions

\[
2(x - 3y = -3) \\
2x + y = 8 \\
2x - 6y = -6 \\
7y = 14 \\
y = 2
\]

ANS: 2  REF: 081115ia  STA: A.A.32  TOP: Slope

ANS: 4  REF: 081021ia  STA: A.A.10  TOP: Solving Linear Systems

\[
-3x(x - 4) - 2x(x + 3) = -3x^2 + 12x - 2x^2 - 6x = -5x^2 + 6x
\]

ANS: 4  REF: 081114ia  STA: A.A.13  TOP: Addition and Subtraction of Monomials

ANS: 1  REF: 061021ia  STA: A.A.29  TOP: Set Theory

ANS: 4  REF: 080928ia  STA: A.A.6  TOP: Modeling Equations

Let \(x\) = youngest brother and \(x + 4\) = oldest brother.  \(3x - (x + 4) = 48.\)

\[
2x - 4 = 48 \\
x = 26
\]
Integrated Algebra Multiple Choice Regents Exam Questions

Answer Section

362 ANS: 2
The volume of the cube using Ezra’s measurements is 8 ($2^3$). The actual volume is 9.261 ($2.1^3$). The relative error is
$$\frac{9.261 - 8}{9.261} \approx 0.14.$$ 

REF: 060928ia STA: A.M.3 TOP: Error KEY: volume and surface area

363 ANS: 4
$SA = 2lw + 2hw + 2lh = 2(3)(1.5) + 2(2)(1.5) + 2(3)(2) = 27$

REF: 060827ia STA: A.G.2 TOP: Surface Area

364 ANS: 1
$-2x + 5 > 17$
$-2x > 12$
$x < -6$

REF: fall0724ia STA: A.A.21 TOP: Interpreting Solutions

365 ANS: 4
REF: fall0704ia STA: A.A.29 TOP: Set Theory

366 ANS: 3
$$m = \frac{1 - (-4)}{-6 - 4} = -\frac{1}{2}$$

REF: 060820ia STA: A.A.33 TOP: Slope

367 ANS: 4
$$\frac{2^6}{2^1} = 2^5$$

REF: 060813ia STA: A.A.12 TOP: Division of Powers

368 ANS: 4
$$\frac{344 \text{ m}}{\text{sec}} \times \frac{60 \text{ sec}}{1 \text{ min}} \times \frac{60 \text{ min}}{1 \text{ hr}} = 1,238,400 \text{ m/hr}$$

REF: 060911ia STA: A.M.2 TOP: Conversions KEY: dimensional analysis

369 ANS: 2
The median score, 10, is the vertical line in the center of the box.

REF: fall0709ia STA: A.S.5 TOP: Box-and-Whisker Plots

370 ANS: 2
$1.5^3 = 3.375$

REF: 060809ia STA: A.G.2 TOP: Volume
The slope of $y = 3 - 2x$ is $-2$. Using $m = \frac{A}{B}$, the slope of $4x + 2y = 5$ is $\frac{4}{2} = -2$.

$x^2 - x - 20 = 3x - 15$. $y = 3x - 15$.

$x^2 - 4x - 6 = 0$ 
$= 3(-1) - 15$

$(x = 5)(x + 1) = 0$ 
$= -18$

$x = 5$ or $-1$

$x^2 - x - 20 = 3x - 15$. $y = 3x - 15$.

$x^2 - 4x - 6 = 0$ 
$= 3(-1) - 15$

$(x = 5)(x + 1) = 0$ 
$= -18$

$x = 5$ or $-1$

$\frac{2x}{5} + \frac{1}{3} = \frac{7x - 2}{15}$

$(2x \times 3) + (5 \times 1) = \frac{7x - 2}{15}$

$5 \times 3$ 
$\frac{6x + 5}{15} = \frac{7x - 2}{15}$

$6x + 5 = 7x - 2$

$x = 7$

The set of integers greater than $-2$ and less than $6$ is $\{-1, 0, 1, 2, 3, 4, 5\}$. The subset of this set that is the positive factors of $5$ is $\{1, 5\}$. The complement of this subset is $\{-1, 0, 2, 3, 4\}$.
378 ANS: 3
\[3ax + b = c\]
\[3ax = c - b\]
\[x = \frac{c - b}{3a}\]

REF: 080808ia STA: A.A.23 TOP: Transforming Formulas

379 ANS: 1
\[0.07m + 19 \leq 29.50\]
\[0.07m \leq 10.50\]
\[m \leq 150\]

REF: 010904ia STA: A.A.6 TOP: Modeling Inequalities

380 ANS: 3
\[b = 42 - r \quad r = 2b + 3\]
\[r = 2b + 3 \quad r = 2(42 - r) + 3\]
\[r = 84 - 2r + 3\]
\[3r = 87\]
\[r = 29\]

REF: 060812ia STA: A.A.7 TOP: Writing Linear Systems

381 ANS: 2
\[\frac{9x^4 - 27x^6}{3x^3} = \frac{9x^4(1 - 3x^2)}{3x^3} = 3x(1 - 3x^2)\]

REF: fall0718ia STA: A.A.16 TOP: Rational Expressions
KEY: \(a > 0\)

382 ANS: 1
\[x = \frac{-b}{2a} = \frac{-(-16)}{2(1)} = 8. \quad y = (8)^2 - 16(8) + 63 = -1\]

REF: 060918ia STA: A.A.41 TOP: Identifying the Vertex of a Quadratic Given Equation

383 ANS: 4 REF: 080903ia STA: A.A.12 TOP: Multiplication of Powers

384 ANS: 4 REF: fall0730ia STA: A.G.3 TOP: Defining Functions
KEY: graphs

385 ANS: 3
\[\frac{(2x^3)(8x^5)}{4x^6} = \frac{16x^8}{4x^6} = 4x^2\]

REF: fall0703ia STA: A.A.12 TOP: Division of Powers

386 ANS: 1 REF: 060801ia STA: A.G.4 TOP: Families of Functions

387 ANS: 4 REF: 060829ia STA: A.G.5 TOP: Graphing Quadratic Functions
388 ANS: 2
3c + 4m = 12.50
3c + 2m = 8.50
2m = 4.00
m = 2.00
REF: 060806ia STA: A.A.7 TOP: Writing Linear Systems

389 ANS: 4
\[ \frac{\text{distance}}{\text{time}} = \frac{24}{6} = 4 \]
REF: 010902ia STA: A.M.1 TOP: Speed

390 ANS: 2
\[ \left| \frac{149.6 - 174.2}{149.6} \right| \approx 0.1644 \]
REF: 080926ia STA: A.M.3 TOP: Error KEY: area

391 ANS: 2
REF: 080815ia STA: A.G.1 TOP: Compositions of Polygons and Circles

392 ANS: 1
\[ \frac{\sqrt{32}}{4} = \sqrt{\frac{16 \cdot 2}{4}} = \sqrt{2} \]
REF: 060828ia STA: A.N.2 TOP: Simplifying Radicals

393 ANS: 3
REF: 010910ia STA: A.A.35 TOP: Writing Linear Equations

394 ANS: 1
\[ \sin C = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{13}{85} \]
REF: fall0721ia STA: A.A.42 TOP: Trigonometric Ratios

395 ANS: 1
REF: 060811ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph

396 ANS: 1
\[ x - 2y = 1 \]
\[ x + 4y = 7 \]
\[ -6y = -6 \]
\[ y = 1 \]
REF: 080920ia STA: A.A.10 TOP: Solving Linear Systems

397 ANS: 1
\[ \frac{1}{8} \times \frac{1}{8} = \frac{1}{64} \]
REF: 010928ia STA: A.S.23 TOP: Geometric Probability
398 ANS: 4
\(A = \{2, 4, 6, 8, 10, 12, 14, 16, 18, 20\}\)

REF: 080912ia STA: A.A.30 TOP: Set Theory

399 ANS: 3
The other situations are quantitative.

REF: 060905ia STA: A.S.1 TOP: Analysis of Data

400 ANS: 3
\(|-5(5) + 12| = |-13| = 13\)

REF: 080923ia STA: A.N.6 TOP: Evaluating Expressions

401 ANS: 2 REF: 010925ia STA: A.A.15 TOP: Undefined Rationals

402 ANS: 2
The slope of the inequality is \(-\frac{1}{2}\).

REF: fall0720ia STA: A.G.6 TOP: Linear Inequalities

403 ANS: 2
\(\frac{2x^2 - 12x}{x - 6} = \frac{2x(x - 6)}{x - 6} = 2x\)

REF: 060824ia STA: A.A.16 TOP: Rational Expressions
KEY: a > 0

404 ANS: 1
30^2 + 40^2 = c^2. 30, 40, 50 is a multiple of 3, 4, 5.

\[2500 = c^2\]
\[50 = c\]

REF: fall0711ia STA: A.A.45 TOP: Pythagorean Theorem

405 ANS: 2
\(\sqrt{32} = \sqrt{16} \cdot \sqrt{2} = 4\sqrt{2}\)

REF: 060910ia STA: A.N.2 TOP: Simplifying Radicals

406 ANS: 4
\(\frac{5}{45} = \frac{8}{x}\)
\[5x = 360\]
\[x = 72\]

REF: 060901ia STA: A.M.1 TOP: Speed

407 ANS: 1 REF: 080902ia STA: A.A.19 TOP: Factoring the Difference of Perfect Squares

408 ANS: 1 REF: 080911ia STA: A.A.36 TOP: Parallel and Perpendicular Lines

409 ANS: 1 REF: 060807ia STA: A.A.13 TOP: Multiplication of Polynomials
410 ANS: 4 REF: 010908ia STA: A.A.9 TOP: Exponential Functions
411 ANS: 3
The value of the third quartile is the last vertical line of the box.

REF: 080818ia STA: A.S.6 TOP: Box-and-Whisker Plots
412 ANS: 2 REF: 010909ia STA: A.A.19
TOP: Factoring the Difference of Perfect Squares
413 ANS: 2
\[
\frac{3}{2x} + \frac{4}{3x} = \frac{9x + 8x}{6x^2} = \frac{17x}{6x^2} = \frac{17}{6x}
\]

REF: 080917ia STA: A.A.17 TOP: Addition and Subtraction of Rationals
414 ANS: 2 REF: 080930ia STA: A.S.17 TOP: Scatter Plots
415 ANS: 2
The two values are shoe size and height.

REF: fall0714ia STA: A.S.2 TOP: Analysis of Data
416 ANS: 4

\[
5p - 1 = 2p + 20
\]

\[
3p = 21
\]

\[
p = 7
\]

REF: 080801ia STA: A.A.22 TOP: Solving Equations
417 ANS: 4 REF: 010927ia STA: A.N.4 TOP: Operations with Scientific Notation
418 ANS: 2
\[
\tan 32 = \frac{x}{25}
\]

\[
x \approx 15.6
\]

REF: 080914ia STA: A.A.44 TOP: Using Trigonometry to Find a Side
419 ANS: 2 REF: fall0701ia STA: A.S.7 TOP: Scatter Plots
420 ANS: 3 REF: fall0702ia STA: A.S.23 TOP: Theoretical Probability
KEY: mutually exclusive events
421 ANS: 3 REF: 080819ia STA: A.A.13 TOP: Addition and Subtraction of Polynomials
KEY: subtraction
\[
\begin{align*}
\text{ANS: } & 1 \\
x^2 + 7x + 10 = 0 \\
(x + 5)(x + 2) = 0 \\
x = -5 \text{ or } -2 \\
\text{REF: } & 080918ia \\
\text{STA: } & A.A.15 \\
\text{TOP: } & \text{Undefined Rationals}
\end{align*}
\]

\[
\begin{align*}
\text{ANS: } & 4 \\
\text{REF: } & 060805ia \\
\text{STA: } & A.S.12 \\
\text{TOP: } & \text{Scatter Plots}
\end{align*}
\]

\[
\begin{align*}
\text{ANS: } & 3 \\
\text{REF: } & 060926ia \\
\text{STA: } & A.N.1 \\
\text{TOP: } & \text{Properties of Reals}
\end{align*}
\]

\[
\begin{align*}
\text{ANS: } & 4 \\
\text{REF: } & 060916ia \\
\text{STA: } & A.A.15 \\
\text{TOP: } & \text{Undefined Rationals}
\end{align*}
\]

\[
\begin{align*}
\text{ANS: } & 4 \\
\text{REF: } & \text{fall0729ia} \\
\text{STA: } & A.A.2 \\
\text{TOP: } & \text{Expressions}
\end{align*}
\]

\[
\begin{align*}
x^2 + 5x + 6 = -x + 1. & \quad y = -x + 1 \\
x^2 + 6x + 5 = 0 & \quad = -(-5) + 1 \\
(x + 5)(x + 1) = 0 & \quad = 6 \\
x = -5 \text{ or } -1 \\
\text{REF: } & 080812ia \\
\text{STA: } & A.A.11 \\
\text{TOP: } & \text{Quadratic-Linear Systems}
\end{align*}
\]

\[
\begin{align*}
\text{ANS: } & 3 \\
\sqrt{72} & = \sqrt{36 \cdot 2} = 6\sqrt{2} \\
\text{REF: } & 010920ia \\
\text{STA: } & A.N.2 \\
\text{TOP: } & \text{Simplifying Radicals}
\end{align*}
\]

\[
\begin{align*}
\text{ANS: } & 3 \\
\cos 30 & = \frac{x}{24} \\
x & \approx 21 \\
\text{REF: } & 010912ia \\
\text{STA: } & A.A.44 \\
\text{TOP: } & \text{Using Trigonometry to Find a Side}
\end{align*}
\]

\[
\begin{align*}
\text{ANS: } & 4 \\
\text{REF: } & \text{fall0717ia} \\
\text{STA: } & A.G.4 \\
\text{TOP: } & \text{Families of Functions}
\end{align*}
\]

\[
\begin{align*}
\text{ANS: } & 2 \\
\text{If the car can travel 75 miles on 4 gallons, it can travel 300 miles on } 16 \text{ gallons. } & \quad \frac{75}{4} = \frac{x}{16} \\
x & = 300 \\
\text{REF: } & 080807ia \\
\text{STA: } & A.G.4 \\
\text{TOP: } & \text{Graphing Linear Functions}
\end{align*}
\]

\[
\begin{align*}
\text{ANS: } & 3 \\
\text{REF: } & 060919ia \\
\text{STA: } & A.G.3 \\
\text{TOP: } & \text{Defining Functions}
\end{align*}
\]

KEY: graphs
433 ANS: 1
\[ 8^2 + 15^2 = c^2 \]
\[ c^2 = 289 \]
\[ c = 17 \]

REF: 080906ia STA: A.A.45 TOP: Pythagorean Theorem

434 ANS: 1
\[ y = mx + b \]
\[ -6 = (-3)(4) + b \]
\[ b = 6 \]

REF: 060922ia STA: A.A.34 TOP: Writing Linear Equations

435 ANS: 2
REF: 010915ia STA: A.A.5 TOP: Modeling Equations

436 ANS: 3
REF: 080925ia STA: A.G.4 TOP: Identifying the Equation of a Graph

437 ANS: 1
REF: 080824ia STA: A.A.43 TOP: Using Trigonometry to Find an Angle

438 ANS: 3
REF: fall0706ia STA: A.A.19 TOP: Factoring the Difference of Perfect Squares

439 ANS: 3
The other situations are quantitative.

REF: 060819ia STA: A.S.1 TOP: Analysis of Data

440 ANS: 3
REF: 060924ia STA: A.G.8 TOP: Solving Quadratics by Graphing

441 ANS: 3
REF: 060817ia STA: A.A.15 TOP: Undefined Rationals

442 ANS: 3
\[ \frac{k + 4}{2} = \frac{k + 9}{3} \]
\[ 3(k + 4) = 2(k + 9) \]
\[ 3k + 12 = 2k + 18 \]
\[ k = 6 \]

REF: 010906ia STA: A.A.26 TOP: Solving Rationals

443 ANS: 4
\[ P(G \text{ or } W) = \frac{4}{8}, \ P(G \text{ or } B) = \frac{3}{8}, \ P(Y \text{ or } B) = \frac{4}{8}, \ P(Y \text{ or } G) = \frac{5}{8} \]

REF: 060802ia STA: A.S.22 TOP: Geometric Probability

444 ANS: 3
\[ 25 - 18 = 7 \]

REF: 060822ia STA: A.S.9 TOP: Frequency Histograms, Bar Graphs and Tables
\[
\frac{6}{4a} - \frac{2}{3a} = \frac{18a - 8a}{12a^2} = \frac{10a}{12a^2} = \frac{5}{6a}
\]

REF: 060929ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

ANS: 2

\[
5\sqrt{20} = 5\sqrt{4 \cdot 5} = 10\sqrt{5}
\]

REF: 080922ia STA: A.N.2 TOP: Simplifying Radicals

ANS: 2

\[
P(O) = \frac{3}{6}, P(E) = \frac{3}{6}, P(< 6) = \frac{5}{6}, P(> 4) = \frac{2}{6}
\]

REF: 010903ia STA: A.S.22 TOP: Theoretical Probability

ANS: 4

\[
-4x + 2 > 10
\]

\[
-4x > 8
\]

\[
x < -2
\]

REF: 080804ia STA: A.S.4 TOP: Central Tendency

ANS: 4

\[
x^2 - 6x = 0
\]

\[
x(x - 6) = 0
\]

\[
x = 0 \times x = 6
\]

REF: 080921ia STA: A.A.27 TOP: Solving Quadratics by Factoring

ANS: 3

\[
x + 2y = 9
\]

\[
x - y = 3
\]

\[
3y = 6
\]

\[
y = 2
\]

REF: 060925ia STA: A.A.10 TOP: Solving Linear Systems
\[
\frac{4x}{x - 1} \cdot \frac{x^2 - 1}{3x + 3} = \frac{4x}{x - 1} \cdot \frac{(x + 1)(x - 1)}{3(x + 1)} = \frac{4x}{3}
\]

REF: 080826ia STA: A.A.18 TOP: Multiplication and Division of Rationals
KEY: multiplication

\[500(1 + 0.06)^3 \approx 596\]

REF: 080929ia STA: A.A.9 TOP: Exponential Functions

\[x^2 - 7x + 6 = 0\]
\[(x - 6)(x - 1) = 0\]
\[x = 6 \quad x = 1\]

REF: 060902ia STA: A.A.28 TOP: Roots of Quadratics

\[A = lw = (3w - 7)(w) = 3w^2 - 7w\]

REF: 010924ia STA: A.A.1 TOP: Expressions

\[L + S = 47\]
\[L - S = 15\]
\[2L = 62\]
\[L = 31\]

REF: 060912ia STA: A.A.7 TOP: Writing Linear Systems

Surveying persons leaving a football game about a sports budget contains the most bias.

REF: 080910ia STA: A.S.3 TOP: Analysis of Data

\[35000(1 - 0.05)^4 \approx 28507.72\]

REF: fall0719ia STA: A.A.9 TOP: Exponential Functions
467 ANS: 4

REF: 080822ia STA: A.S.8 TOP: Scatter Plots

468 ANS: 2 REF: 060904ia STA: A.A.1 TOP: Expressions

469 ANS: 1

\[ m = \frac{4 - (-4)}{-5 - 15} = -\frac{2}{5} \]

REF: 080915ia STA: A.A.33 TOP: Slope

470 ANS: 1 REF: fall0728ia STA: A.A.15 TOP: Undefined Rationals

471 ANS: 4

Since \( y = x \), the solutions are (2, 2) and \((-1, -1)\).

\[ x^2 - 2 = x \]

\[ x^2 - x - 2 = 0 \]

\( (x - 2)(x + 1) = 0 \)

\[ x = 2 \text{ or } -1 \]

REF: 060810ia STA: A.A.11 TOP: Quadratic-Linear Systems

472 ANS: 2 REF: fall0725ia STA: A.N.4 TOP: Operations with Scientific Notation

473 ANS: 3

0.75 hours = 45 minutes. \( \frac{120}{1} = \frac{x}{45} \)

\[ x = 5400 \]

REF: 080814ia STA: A.M.1 TOP: Using Rate

474 ANS: 4

\[ V = \pi r^2 h = \pi \cdot 6^2 \cdot 15 \approx 1696.5 \]

REF: fall0712ia STA: A.G.2 TOP: Volume

475 ANS: 2 REF: 080823ia STA: A.A.32 TOP: Slope

476 ANS: 1

The slope of both is \(-4\).

REF: 060814ia STA: A.A.38 TOP: Parallel and Perpendicular Lines

477 ANS: 1 REF: 080924ia STA: A.G.1 TOP: Compositions of Polygons and Circles

KEY: perimeter
\[a + ar = b + r\]
\[a(1 + r) = b + r\]
\[a = \frac{b + r}{1 + r}\]

REF: 060913ia STA: A.A.23 TOP: Transforming Formulas

479 ANS: 4 REF: 060906ia STA: A.A.4 TOP: Modeling Inequalities

480 ANS: 1
\[\frac{4}{3}x + 5 < 17\]
\[\frac{4}{3}x < 12\]
\[4x < 36\]
\[x < 9\]

REF: 060914ia STA: A.A.21 TOP: Interpreting Solutions

481 ANS: 3
\[x^2 - 10x + 21 = 0\]
\[(x - 7)(x - 3) = 0\]
\[x = 7 \quad x = 3\]

REF: 010914ia STA: A.A.28 TOP: Roots of Quadratics

482 ANS: 4 The transformation is a reflection in the x-axis.

REF: fall0722ia STA: A.G.5 TOP: Graphing Absolute Value Functions

483 ANS: 2 REF: 080901ia STA: A.A.4 TOP: Modeling Equations

484 ANS: 1
\[
\frac{(2x \times 6) + (3 \times x)}{3 \times 6} = 5
\]
\[
\frac{12x + 3x}{18} = 5
\]
\[15x = 90\]
\[x = 6\]

REF: 060907ia STA: A.A.25 TOP: Solving Equations with Fractional Expressions
Everyone eats, can shop in malls and wear clothes. People who work in a sporting goods store probably watch more sports television than most.
\[
\frac{3}{5} (x + 2) = x - 4
\]
3(x + 2) = 5(x - 4)
3x + 6 = 5x - 20
26 = 2x
x = 13

ANS: 2
REF: 080909ia STA: A.A.25 TOP: Solving Equations with Fractional Expressions

\[
\frac{4 \times 3 \times 2 \times 1}{4!} = 24
\]

ANS: 1
REF: 080816ia STA: A.N.8 TOP: Permutations

A rooster crows before sunrise, not because of the sun.

ANS: 2
REF: fall0707ia STA: A.S.14 TOP: Analysis of Data

\[
sin A = \frac{8}{12}
\]

\[A \approx 42\]

ANS: 3
REF: 060816ia STA: A.A.43 TOP: Using Trigonometry to Find an Angle

The number of correct answers on a test causes the test score.

ANS: 4
REF: 080908ia STA: A.S.13 TOP: Analysis of Data

\[
w(w + 5) = 36
\]
\[w^2 + 5w - 36 = 0\]

ANS: 2
REF: fall0726ia STA: A.A.5 TOP: Modeling Equations

\[
l(l - 5) = 24
\]
\[l^2 - 5l - 24 = 0\]
\[(l - 8)(l + 3) = 0\]
\[l = 8\]

ANS: 2
REF: 080817ia STA: A.A.8 TOP: Geometric Applications of Quadratics
503 ANS: 4
\[ 16^2 + b^2 = 34^2 \]
\[ b^2 = 900 \]
\[ b = 30 \]

REF: 080809ia STA: A.A.45 TOP: Pythagorean Theorem

504 ANS: 1
REF: 010905ia STA: A.G.4 TOP: Families of Functions

505 ANS: 2
REF: 080802ia STA: A.N.1 TOP: Identifying Properties

506 ANS: 4
The mean is 80.6, the median is 84.5 and the mode is 87.

REF: 010907ia STA: A.S.4 TOP: Central Tendency

507 ANS: 2
\[ 2x^2 + 10x - 12 = 2(x^2 + 5x - 6) = 2(x + 6)(x - 1) \]

REF: 080806ia STA: A.A.20 TOP: Factoring Polynomials

KEY: subtraction

508 ANS: 2
REF: 060923ia STA: A.A.13 TOP: Addition and Subtraction of Polynomials

509 ANS: 3
\[ 3^2 + 5^2 = x^2 \]
\[ 34 = x^2 \]
\[ \sqrt{34} = x \]

REF: 060909ia STA: A.A.45 TOP: Pythagorean Theorem

510 ANS: 2
REF: 080810ia STA: A.A.36 TOP: Parallel and Perpendicular Lines

511 ANS: 3
REF: fall0710ia STA: A.A.31 TOP: Set Theory

512 ANS: 2
REF: 080916ia STA: A.G.8 TOP: Solving Quadratics by Graphing

513 ANS: 2
\[ \frac{x^2 - 2x - 15}{x^2 + 3x} = \frac{(x - 5)(x + 3)}{x(x + 3)} = \frac{x - 5}{x} \]

REF: 060921ia STA: A.A.16 TOP: Rational Expressions

KEY: \( a > 0 \)

514 ANS: 2
\[ \sin U = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{15}{17} \]

REF: 010919ia STA: A.A.42 TOP: Trigonometric Ratios

515 ANS: 3
REF: 060808ia STA: A.N.8 TOP: Permutations
\[ m = \frac{4 - 10}{3 - (-6)} = \frac{2}{3} \]

516 ANS: 3

517 ANS: 3 REF: fall0716ia STA: A.A.33 TOP: Slope

518 ANS: 4

\[-2(x - 5) < 4\]
\[-2x + 10 < 4\]
\[-2x < -6\]
\[x > 3\]

519 ANS: 2

\[s + a = 126. s + 2s = 126\]
\[a = 2s\]
\[s = 42\]

520 ANS: 4 REF: 010929ia STA: A.S.6 TOP: Box-and-Whisker Plots

521 ANS: 4 REF: 060927ia STA: A.N.4 TOP: Operations with Scientific Notation

522 ANS: 3

The value of the upper quartile is the last vertical line of the box.

523 ANS: 4

\[25(x - 3) = 25x - 75\]

524 ANS: 3

An element of the domain, 1, is paired with two different elements of the range, 3 and 7.

525 ANS: 4 REF: 010930ia STA: A.G.3 TOP: Defining Functions


527 ANS: 1

\[13.95 + 0.49s \leq 50.00\]
\[0.49s \leq 36.05\]
\[s \leq 73.57\]

528 ANS: 4

REF: 080913ia STA: A.A.21 TOP: Interpreting Solutions

529 ANS: 4 REF: 060811ia STA: A.A.7 TOP: Writing Linear Systems

530 ANS: 4 REF: 060823ia STA: A.A.1 TOP: Expressions

531 ANS: 3

REF: 060915ia STA: A.S.6 TOP: Box-and-Whisker Plots

532 ANS: 4

\[25(x - 3) = 25x - 75\]

533 ANS: 3

An element of the domain, 1, is paired with two different elements of the range, 3 and 7.

534 ANS: 4 REF: 080919ia STA: A.G.3 TOP: Defining Functions

535 ANS: 4 REF: 010930ia STA: A.G.3 TOP: Defining Functions


537 ANS: 1

\[13.95 + 0.49s \leq 50.00\]
\[0.49s \leq 36.05\]
\[s \leq 73.57\]

538 ANS: 4

REF: 080904ia STA: A.A.6 TOP: Modeling Inequalities
\[
\frac{(d \times 3) + (2 \times 2d)}{2 \times 3} = \frac{3d + 4d}{6} = \frac{7d}{6}
\]

REF: fall0727ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

ANS: 4

\[
y = mx + b
-1 = (2)(3) + b
b = -7
\]

REF: 080927ia STA: A.A.34 TOP: Writing Linear Equations

ANS: 4

\[
\frac{5}{x} = \frac{x + 13}{6}
\]

\[x^2 + 13x = 30\]

\[x^2 + 13x - 30 = 0\]

\[(x + 15)(x - 2) = 0\]

\[x = -15 \text{ or } 2\]

REF: 060826ia STA: A.A.26 TOP: Solving Rationals

ANS: 2

\[
P = 2l + 2w
P - 2l = 2w
\frac{P - 2l}{2} = w
\]

REF: 010911ia STA: A.A.23 TOP: Transforming Formulas

ANS: 1

To determine student interest, survey the widest range of students.

REF: 060803ia STA: A.S.3 TOP: Analysis of Data

ANS: 3

\[
\sin A = \frac{10}{16} \quad B = 180 - (90 = 38.7) = 51.3. \quad A \approx 38.7
\]

A 90° angle is not acute.

REF: 080829ia STA: A.A.43 TOP: Using Trigonometry to Find an Angle
The events are not mutually exclusive: 
\[ P(\text{prime}) = \frac{3}{6}, \quad P(\text{even}) = \frac{3}{6}, \quad P(\text{prime AND even}) = \frac{1}{6} \]

\[ P(\text{prime OR even}) = \frac{3}{6} + \frac{3}{6} - \frac{1}{6} = \frac{5}{6} \]

Key: not mutually exclusive events

Using the given y-intercept (0, 3) to write the equation of the line 
\[ y = \frac{3}{2} x + 3 \]

Key: volume and surface area
Integrated Algebra 2 Point Regents Exam Questions

Answer Section

541  ANS:  \( \frac{3}{8} \).  
\((H,H,H), (H,H,T), (H,T,H), (H,T,T), (T,H,H), (T,H,T), (T,T,H), (T,T,T)\)

PTS:  2  REF:  080933ia  STA:  A.S.19  TOP:  Sample Space

542  ANS:  
\[ bc + ac = ab \]
\[ c(b + a) = ab \]
\[ c = \frac{ab}{b + a} \]

PTS:  2  REF:  081131ia  STA:  A.A.23  TOP:  Transforming Formulas

543  ANS:  
\[ d = 6.25h, 250. \ d = 6.25(40) = 250 \]

PTS:  2  REF:  010933ia  STA:  A.N.5  TOP:  Direct Variation

544  ANS:  
\[ \frac{x - 1}{x + 2} \cdot \frac{x^2 - 1}{x^2 + 3x + 2} = \frac{(x + 1)(x - 1)}{(x + 2)(x + 1)} \]

PTS:  2  REF:  011233ia  STA:  A.A.16  TOP:  Rational Expressions
KEY:  a > 0

545  ANS:  
\[ 5x^3 - 20x^2 - 60x \]
\[ 5x(x^2 - 4x - 12) \]
\[ 5x(x + 2)(x - 6) \]

PTS:  2  REF:  011332ia  STA:  A.A.20  TOP:  Factoring Polynomials

546  ANS:  
\[ \frac{600 - 592}{592} \approx 0.014 \]

PTS:  2  REF:  061031ia  STA:  A.M.3  TOP:  Error
KEY:  volume and surface area

547  ANS:  
\[ \frac{8100 - 7678.5}{7678.5} \approx 0.055 \]

PTS:  2  REF:  061233ia  STA:  A.M.3  TOP:  Error
KEY:  area
548 ANS:

\[ 77120 + 33500 = 110620 \text{ sq. ft.} \times \frac{1 \text{ acre}}{43560 \text{ sq. ft.}} \approx 2.54 \text{ acres} \]

PTS: 2 REF: 081133ia STA: A.M.2 TOP: Conversions
KEY: dimensional analysis

549 ANS:

\[ \frac{5.4 \text{ miles}}{\text{hour}} \times \frac{5280 \text{ feet}}{\text{mile}} \times \frac{1 \text{ hour}}{60 \text{ min}} = \frac{475.2 \text{ ft}}{\text{min}} \]

PTS: 2 REF: 081331ia STA: A.M.2 TOP: Conversions
KEY: dimensional analysis

550 ANS:

5. 48 inches \times \frac{1 \text{ yard}}{36 \text{ inches}} = \frac{4}{3} \text{ yards} \times $3.75 = $5.00

PTS: 2 REF: 011131ia STA: A.M.2 TOP: Conversions
KEY: dimensional analysis

551 ANS:

\[ \frac{3k^2m^6}{4} \]

PTS: 2 REF: 010932ia STA: A.A.12 TOP: Division of Powers

552 ANS:

\[ 4. \quad 3 + 2g = 5g - 9 \]

\[ 12 = 3g \]

\[ g = 4 \]

PTS: 2 REF: fall0732ia STA: A.A.22 TOP: Solving Equations

553 ANS:

\[ 6.56 \times 10^{-2} \]

PTS: 2 REF: 081231ia STA: A.N.4 TOP: Operations with Scientific Notation

554 ANS:

50. \quad 12 + 10 + 12 + \frac{1}{2}(10\pi) \approx 50

PTS: 2 REF: 010931ia STA: A.G.1 TOP: Compositions of Polygons and Circles
KEY: perimeter
-3\sqrt{48} = -3\sqrt{16 \cdot 3} = -12\sqrt{3}

\[ x \approx 2.1 \]

\[ 2.1. \quad \cos 65 = \frac{x}{5} \]

\[ \frac{6}{25} \cdot \frac{25 - (11 + 5 + 3)}{25} \]

\[ \frac{x^2 - 5x - 24}{x - 8} = \frac{(x - 8)(x + 3)}{x - 8} = x + 3 \]

\[ a > 0 \]

(1) Distributive; (2) Commutative

\[ \frac{x + 2}{2} \cdot \frac{4(x + 5)}{(x + 4)(x + 2)} = \frac{2(x + 5)}{x + 4} \]

\[ 111.25. \quad \frac{\text{distance}}{\text{time}} = \frac{89}{0.8} = 111.25 \]

\[ -5(x - 7) < 15 \]

\[ x - 7 > -3 \]

\[ x > 4 \]
564 ANS: \[30\sqrt{2} \cdot 5\sqrt{72} = 5\sqrt{36 \cdot 2} = 30\sqrt{2}\]

PTS: 2  REF: fall0731ia  STA: A.N.2  TOP: Simplifying Radicals

565 ANS: \[
\frac{1375}{1600} \cdot \frac{40^2 - 15^2}{40^2} = \frac{1375}{1600}
\]

PTS: 2  REF: 011132ia  STA: A.S.20  TOP: Geometric Probability

566 ANS:

\[\text{PTF: 2  REF: 081233ia  STA: A.G.4  TOP: Graphing Exponential Functions}\]

567 ANS: \[0 \leq t \leq 40\]

PTS: 2  REF: 060833ia  STA: A.A.31  TOP: Set Theory

568 ANS: \[36 - 9\pi. \ 15.6. \text{Area of square--area of 4 quarter circles.} \ (3 + 3)^2 - 3^2 \pi = 36 - 9\pi\]

PTS: 2  REF: 060832ia  STA: A.G.1  TOP: Compositions of Polygons and Circles

569 ANS: \[
3a^2b^2 - 6a \cdot \frac{45a^4b^3 - 90a^3b}{15a^2b} = \frac{45a^4b^3}{15a^2b} - \frac{90a^3b}{15a^2b} = 3a^2b^2 - 6a
\]

PTS: 2  REF: 081031ia  STA: A.A.14  TOP: Division of Polynomials

570 ANS: \[\frac{3}{8}. \ P(s_1 < 4) \times P(s_2 = \text{back}) = \frac{3}{4} \times \frac{1}{2} = \frac{3}{8}\]

PTS: 2  REF: 080832ia  STA: A.S.23  TOP: Geometric Probability

571 ANS: Not all of the homework problems are equations. The first problem is an expression.

PTS: 2  REF: 080931ia  STA: A.A.3  TOP: Expressions
33.4. Serena needs 24 \((9 + 6 + 9)\) feet of fencing to surround the rectangular portion of the garden. The length of the fencing needed for the semicircular portion of the garden is \(\frac{1}{2} \pi d = 3\pi \approx 9.4\) feet.

\[2 \sqrt{108} = 2 \sqrt{36 \cdot 3} = 12\sqrt{3}\]

PTS: 2  
REF: fall0733ia  
STA: A.G.1  
TOP: Compositions of Polygons and Circles

\(\text{orchestra: } \frac{3}{26} > \frac{4}{36}\)

PTS: 2  
REF: 081332ia  
STA: A.N.2  
TOP: Simplifying Radicals

\(t = \frac{d}{s} = \frac{136,000,000}{31,000} \approx 4387.1\) hours. \(\frac{4387.1}{24} \approx 183\)

PTS: 2  
REF: 011033ia  
STA: A.S.22  
TOP: Theoretical Probability

16. 12 feet equals 4 yards. \(4 \times 4 = 16\).

PTS: 2  
REF: 011031ia  
STA: A.M.2  
TOP: Conversions

\(\text{White. There are 31 white blocks, 30 red blocks and 29 blue blocks.}\)

PTS: 2  
REF: 061232ia  
STA: A.S.22  
TOP: Theoretical Probability

\(\{1,2,4,5,9,10,12\}\)

PTS: 2  
REF: 080833ia  
STA: A.A.30  
TOP: Set Theory

147.75 \(2 \times 5.5 \times 3 + 2 \times 6.75 \times 3 + 2 \times 5.5 \times 6.75 = 147.75\)

PTS: 2  
REF: 011231ia  
STA: A.G.2  
TOP: Surface Area

53. \(\sin A = \frac{16}{20}\)

\(A \approx 53\)

PTS: 2  
REF: 011032ia  
STA: A.A.43  
TOP: Using Trigonometry to Find an Angle
581 ANS:
\[ V = \pi r^2 h = \pi \cdot 6.5^2 \cdot 24 = 1014\pi \]

PTS: 2  REF: 061332ia  STA: A.G.2  TOP: Volume

582 ANS:
\[ 2,160 \frac{1,200}{25} = \frac{x}{45} \]
\[ 25x = 54,000 \]
\[ x = 2,160 \]

PTS: 2  REF: 081032ia  STA: A.M.1  TOP: Using Rate

583 ANS:
\[-6a + 42. \text{ distributive} \]

PTS: 2  REF: 061032ia  STA: A.N.1  TOP: Properties of Reals

584 ANS:
\[ \frac{1}{8} \]. After the English and social studies books are taken, 8 books are left and 1 is an English book.

PTS: 2  REF: 060933ia  STA: A.S.18  TOP: Conditional Probability

585 ANS:
\[ \sin x = \frac{30}{50} \]
\[ x = \sin^{-1} \frac{3}{5} \]
\[ x \approx 37 \]

PTS: 2  REF: 061033ia  STA: A.A.43  TOP: Using Trigonometry to Find an Angle

586 ANS:

PTS: 2  REF: 011333ia  STA: A.G.4  TOP: Graphing Absolute Value Functions
587 ANS: 

![Frequency Histogram](image)

PTS: 2 REF: 081132ia STA: A.S.5 TOP: Frequency Histograms, Bar Graphs and Tables

KEY: frequency histograms

588 ANS: 

5,112. \( (12 \times 30 \times 16) - (6 \times 12 \times 9) = 5112 \)

PTS: 2 REF: 080932ia STA: A.G.2 TOP: Volume

589 ANS: 

2. Subtracting the equations: \( 3y = 6 \)

\[ y = 2 \]

PTS: 2 REF: 061231ia STA: A.A.10 TOP: Solving Linear Systems

590 ANS: 

\[ 4x(x + 3)(x - 3). \quad 4x^3 - 36x = 4x(x^2 - 9) = 4x(x + 3)(x - 3) \]

PTS: 2 REF: 060932ia STA: A.A.19 TOP: Factoring the Difference of Perfect Squares

591 ANS: 

Ann’s. \( \frac{225}{15} = 15 \text{ mpg} \) is greater than \( \frac{290}{23.2} = 12.5 \text{ mpg} \)

PTS: 2 REF: 060831ia STA: A.M.1 TOP: Using Rate

592 ANS: 

\[ x = 1; \quad (1, -5) \]

PTS: 2 REF: 061133ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph

593 ANS: 

\[ 4\sqrt{75} = 4\sqrt{25 \cdot 3} = 20\sqrt{3} \]

PTS: 2 REF: 011331ia STA: A.N.2 TOP: Simplifying Radicals
ANS:

\[ A = P(1 + R)^t = 2000(1 + 0.035)^4 \approx 2295 \]

PTS: 2       REF: 081333ia       STA: A.A.9       TOP: Exponential Functions
Integrated Algebra 3 Point Regents Exam Questions
Answer Section

595 ANS:
Greg’s rate of 5.5 is faster than Dave’s rate of 5.3. \( \frac{\text{distance}}{\text{time}} = \frac{11}{2} = 5.5 \), \( \frac{16}{3} = 5.3 \)

PTS: 3 REF: 080936ia STA: A.M.1 TOP: Speed

596 ANS:

The graph becomes steeper.

PTS: 3 REF: 081134ia STA: A.G.5 TOP: Graphing Absolute Value Functions

597 ANS:
The turtle won by .5 minutes. Turtle: \( \frac{d}{s} = \frac{100}{20} = 5 \). Rabbit: \( \frac{d}{s} = \frac{100}{40} = 2.5 + 3 = 5.5 \)

PTS: 3 REF: 011236ia STA: A.M.1 TOP: Speed

598 ANS:
\[ -12 \cdot \left( \frac{2}{3} x + 3 < -2x - 7 \right) \]
\[ x + 9 < -6x - 21 \]
\[ 7x < -30 \]
\[ x < -\frac{30}{7} \]

PTS: 3 REF: 061034ia STA: A.A.21 TOP: Interpreting Solutions

599 ANS:
\[ 6\sqrt{3} \cdot \frac{3\sqrt{75} + \sqrt{27}}{3} = \frac{3\sqrt{25\cdot3} + \sqrt{9\cdot3}}{3} = \frac{15\sqrt{3} + 3\sqrt{3}}{3} = \frac{18\sqrt{3}}{3} = 6\sqrt{3} \]

PTS: 3 REF: 061236ia STA: A.N.3 TOP: Operations with Radicals
600 ANS:
\[
\frac{38}{\pi}, \text{ and } 2. \quad V = \pi r^2 h \quad \Rightarrow \quad \frac{36}{\pi} \approx 2.97. \text{ Three cans will not fit. The maximum number is 2.}
\]

\[
\frac{342}{\pi} = h
\]

\[
\frac{38}{\pi} = h
\]

PTS: 3 \quad REF: 010936ia \quad STA: A.G.2 \quad TOP: Volume

601 ANS:
\[
-2\sqrt{3} \quad \frac{16\sqrt{21}}{2\sqrt{7}} - 5\sqrt{12} = 8\sqrt{3} - 5\sqrt{4} \sqrt{3} = 8\sqrt{3} - 10\sqrt{3} = -2\sqrt{3}
\]

PTS: 3 \quad REF: 081136ia \quad STA: A.N.3 \quad TOP: Operations with Radicals

602 ANS:
\[
L - S = 28 \quad \Rightarrow \quad 2S - 8 = S + 28
\]

\[
L = 2S - 8 \quad S = 36
\]

\[
L = S + 28 \quad L = 36 + 28 = 64
\]

PTS: 3 \quad REF: 081335ia \quad STA: A.A.7 \quad TOP: Writing Linear Systems

603 ANS:
\[
y = \frac{3}{4}x + 10. \quad y = mx + b
\]

\[
4 = \frac{3}{4}(-8) + b
\]

\[
4 = -6 + b
\]

\[
10 = b
\]

PTS: 3 \quad REF: 011134ia \quad STA: A.A.34 \quad TOP: Writing Linear Equations

604 ANS:
\[
\frac{3}{4x - 8} \cdot \frac{3x + 6}{4x + 12} \div \frac{x^2 - 4}{x + 3} = \frac{3(x + 2)}{4(x + 3)} \cdot \frac{x + 3}{(x + 2)(x - 2)} = \frac{3}{4(x - 2)}
\]

PTS: 3 \quad REF: 010935ia \quad STA: A.A.18 \quad TOP: Multiplication and Division of Rationals

KEY: division

605 ANS:
7. \quad 15x + 22 \geq 120

\[
x \geq 6.53
\]

PTS: 3 \quad REF: fall0735ia \quad STA: A.A.6 \quad TOP: Modeling Inequalities
606 ANS:

\[ 1,512, 1,551.25, 0.025. \quad 36 \times 42 = 1512. \quad 36.5 \times 42.5 = 1551.25. \quad RE = \frac{1512 - 1551.25}{1551.25} \approx 0.025. \]

PTS: 3     REF: 010934ia     STA: A.M.3     TOP: Error

KEY: area

607 ANS:

3, 0, 20. \quad 15 - 12 = 3. \quad 12 - 12 = 0

PTS: 3     REF: 081234ia     STA: A.S.9     TOP: Frequency Histograms, Bar Graphs and Tables

608 ANS:

\[-15, 2 \quad x^2 + 13x - 30 = 0 \]

\[(x + 15)(x - 2) = 0 \]

\[ x = -15, 2 \]

PTS: 3     REF: 081036ia     STA: A.A.28     TOP: Roots of Quadratics

609 ANS:

\[ 4, -5 \quad \frac{x + 2}{6} = \frac{3}{x - 1} \]

\[(x + 2)(x - 1) = 18 \]

\[x^2 - x + 2x - 2 = 18 \]

\[x^2 + x - 20 = 0 \]

\[(x + 5)(x - 4) = 0 \]

\[ x = -5 \text{ or } 4 \]

PTS: 3     REF: 011136ia     STA: A.A.26     TOP: Solving Rationals

610 ANS:

56. If the circumference of circle \( O \) is 16\( \theta \) inches, the diameter, \( \overline{AD} \), is 16 inches and the length of \( \overline{BC} \) is 12 inches \( \frac{3}{4} \times 16 \). The area of trapezoid \( ABCD \) is \( \frac{1}{2} \times 4(12 + 16) = 56. \)

PTS: 3     REF: 060934ia     STA: A.G.1     TOP: Compositions of Polygons and Circles

KEY: area
611 ANS:

\[ \begin{align*}
\text{PTS: 3} & \quad \text{REF: 011235ia} \quad \text{STA: A.G.7} \quad \text{TOP: Solving Linear Systems} \\
\end{align*} \]

612 ANS:
12, 7. Both the median and the mode will increase.

\[ \begin{align*}
\text{PTS: 3} & \quad \text{REF: 061134ia} \quad \text{STA: A.S.16} \quad \text{TOP: Central Tendency} \\
\end{align*} \]

613 ANS:
\[
0.65x + 35 \leq 45 \\
0.65x \leq 10 \\
x \leq 15
\]

\[ \begin{align*}
\text{PTS: 3} & \quad \text{REF: 061135ia} \quad \text{STA: A.A.6} \quad \text{TOP: Modeling Inequalities} \\
\end{align*} \]

614 ANS:
\[
\frac{(5.9 \times 10.3 \times 1.7) - (6 \times 10 \times 1.5)}{5.9 \times 10.3 \times 1.7} \approx 0.129
\]

\[ \begin{align*}
\text{PTS: 3} & \quad \text{REF: 081235ia} \quad \text{STA: A.M.3} \quad \text{TOP: Error} \\
\text{KEY: volume and surface area} \\
\end{align*} \]

615 ANS:
\[
60 - 42\sqrt{5} : 3\sqrt{20}(2\sqrt{5} - 7) = 6\sqrt{100} - 21\sqrt{20} = 60 - 21\sqrt{4 \times 5} = 60 - 42\sqrt{5}
\]

\[ \begin{align*}
\text{PTS: 3} & \quad \text{REF: 080834ia} \quad \text{STA: A.N.3} \quad \text{TOP: Operations with Radicals} \\
\text{KEY: multiplication} \\
\end{align*} \]

616 ANS:
\[
\tan x = \frac{350}{1000} \\
x \approx 19
\]

\[ \begin{align*}
\text{PTS: 3} & \quad \text{REF: 061335ia} \quad \text{STA: A.A.43} \quad \text{TOP: Using Trigonometry to Find an Angle} \\
\end{align*} \]
**617** ANS:

<table>
<thead>
<tr>
<th>Interval</th>
<th>Tally</th>
<th>Frequency</th>
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</thead>
<tbody>
<tr>
<td>51–60</td>
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<tr>
<td>91–100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOP:** Frequency Histograms, Bar Graphs and Tables  
**KEY:** frequency histograms

**618** ANS:

\[3n + 4p = 8.50 \quad 3(2.50) + 4p = 8.50\]

\[5n + 8p = 14.50 \quad 4p = 1\]

\[6n + 8p = 17 \quad p = 0.25\]

\[n = 2.50\]

**PTS:** 3  
**REF:** 011135ia  
**STA:** A.S.5  
**TOP:** Writing Linear Systems

**619** ANS:

\[\sin x = \frac{8}{12}\]

\[A \approx 41.8\]

**PTS:** 3  
**REF:** 011335ia  
**STA:** A.A.7  
**TOP:** Using Trigonometry to Find an Angle

**620** ANS:

\((-3,-5), (3,7)\). \(x^2 + 2x - 8 = 2x + 1\). \(y = 2(3) + 1 = 7\)

\[x^2 - 9 = 0 \quad y = 2(-3) + 1 = -5\]

\[x = \pm 3\]

**PTS:** 3  
**REF:** 081236ia  
**STA:** A.A.11  
**TOP:** Quadratic-Linear Systems
621 ANS:

![Graph](image1)

PTS: 3 REF: 060836ia STA: A.G.8 TOP: Solving Quadratics by Graphing

622 ANS:

\[
\frac{1}{6}, \ 16.67\%, \$13.50. \quad \frac{18 - 15}{18} = \frac{1}{6}. \quad 18 \times 0.75 = 13.5
\]

PTS: 3 REF: 060835ia STA: A.N.5 TOP: Percents

623 ANS:

minimum is 120, 1st quartile is 145, median is 292, 3rd quartile is 407, and maximum is 452

![Box-and-Whisker Plot](image2)

PTS: 3 REF: 081034ia STA: A.S.5 TOP: Box-and-Whisker Plots

624 ANS:

![Exponential Graph](image3)

. The graph will never intersect the x-axis as \(2^x > 0\) for all values of \(x\).

PTS: 3 REF: 080835ia STA: A.G.4 TOP: Graphing Exponential Functions

625 ANS:

\[
(-2, 11) \quad \begin{align*}
\frac{-b}{2a} &= \frac{-(-8)}{2(-2)} = -2 \\
y &= -2(-2)^2 - 8(-2) + 3 = 11
\end{align*}
\]

PTS: 3 REF: 080934ia STA: A.A.41 TOP: Identifying the Vertex of a Quadratic Given Equation

626 ANS:

(S,S), (S,K), (S,D), (K,S), (K,K), (K,D), (D,S), (D,K), (D,D), \(\frac{4}{9}\)

PTS: 3 REF: fall0736ia STA: A.S.19 TOP: Sample Space
627 ANS: 
\[
\frac{(10.75)(12.5) - (10.5)(12.25)}{(10.75)(12.5)} \approx 0.043
\]

PTS: 3 REF: 081336ia STA: A.M.3 TOP: Error

KEY: area

628 ANS:
\[
0.102. \quad \frac{(5.3 \times 8.2 \times 4.1) - (5 \times 8 \times 4)}{5.3 \times 8.2 \times 4.1} = \frac{178.16 - 160}{178.16} = 0.102
\]

PTS: 3 REF: 011036ia STA: A.M.3 TOP: Error

KEY: volume and surface area

629 ANS:

\[
-2, 3. \quad x^2 - x = 6
\]

\[
x^2 - x - 6 = 0
\]

\[
(x - 3)(x + 2) = 0
\]

\[
x = 3 \text{ or } -2
\]

PTS: 3 REF: 011034ia STA: A.A.28 TOP: Roots of Quadratics

630 ANS:

\[
78. \quad \cos x = \frac{6}{28}
\]

\[
x \approx 78
\]

PTS: 3 REF: 061235ia STA: A.A.43 TOP: Using Trigonometry to Find an Angle

631 ANS:

\[
y = \frac{2}{5} x + 2. \quad m = \frac{4 - 0}{5 - (-5)} = \frac{2}{5}. \quad y = mx + b
\]

\[
4 = \frac{2}{5} (5) + b
\]

\[
b = 2
\]

PTS: 3 REF: 080836ia STA: A.A.35 TOP: Writing Linear Equations

632 ANS:

\[
800 - (895)(0.75)(1.08) = 75.05
\]

PTS: 3 REF: 081334ia STA: A.N.5 TOP: Percents
633 ANS:
\[ 2(x - 4) \geq \frac{1}{2} (5 - 3x) \]
\[ 4(x - 4) \geq 5 - 3x \]
\[ 4x - 16 \geq 5 - 3x \]
\[ 7x \geq 21 \]
\[ x \geq 3 \]

PTS: 3  REF: 011234ia  STA: A.A.24  TOP: Solving Inequalities

634 ANS:
81.3, 80, both increase

PTS: 3  REF: 011035ia  STA: A.S.16  TOP: Central Tendency

635 ANS:
\[ 5 - 2\sqrt{3} + \sqrt{9 - \sqrt{3}} + 2(3) = 5 - 2\sqrt{3} + 3\sqrt{3} + 6 = 11 + \sqrt{3} \]

PTS: 3  REF: 061336ia  STA: A.N.3  TOP: Operations with Radicals

636 ANS:
80, 136  \( V = lwh = 10 \cdot 2 \cdot 4 = 80 \)
\( SA = 2lw + 2hw + 2lh = 2 \cdot 10 \cdot 2 + 2 \cdot 4 \cdot 2 + 2 \cdot 10 \cdot 4 = 136 \)

PTS: 3  REF: 081035ia  STA: A.G.2  TOP: Surface Area

637 ANS:
\[ y = |x| \]
\[ y = \left| \frac{x}{2} \right| \]

Graph becomes wider as the coefficient approaches 0.

PTS: 3  REF: 061035ia  STA: A.G.5  TOP: Graphing Absolute Value Functions

638 ANS:
\[ \text{distance} \]
\[ \frac{\text{time}}{1.2} = 50. \]
\[ \frac{\text{distance}}{40} = 1.5. \]
\[ \text{speed} \times \text{time} = 55 \times 2 = 110. \]
\[ 120 - 110 = 10 \]

PTS: 3  REF: fall0734ia  STA: A.M.1  TOP: Speed
They will not reach their goal in 18 months.

639 ANS:

PTS: 3  REF: 061036ia  STA: A.S.17  TOP: Scatter Plots

640 ANS:

PTS: 3  REF: 060936ia  STA: A.S.8  TOP: Scatter Plots

641 ANS:

\[ 10 + 2d \geq 75, \quad 10 + 2d \geq 75 \]

\[ d \geq 32.5 \]

PTS: 3  REF: 060834ia  STA: A.A.6  TOP: Modeling Inequalities

642 ANS:

\[ 5 \times 3 \times 5 \times 3 = 225, \quad 1 \times 3 \times 5 \times 3 = 45, \quad 1 \times 2 \times 5 \times 3 = 30 \]

PTS: 4  REF: 061334ia  STA: A.N.7  TOP: Multiplication Counting Principle

643 ANS:

PTS: 3  REF: 061234ia  STA: A.G.8  TOP: Solving Quadratics by Graphing
644 ANS:
30.4%; no, 23.3%. \( \frac{7.50 - 5.75}{5.75} = 30.4\%. \quad \frac{7.50 - 5.75}{7.50} = 23.3\% \)

PTS: 3 REF: 080935ia STA: A.N.5 TOP: Percents

645 ANS:
5,583.86. \( A = P(1 + R)^t = 5000(1 + 0.0375)^3 \approx 5583.86 \)

PTS: 3 REF: 060935ia STA: A.A.9 TOP: Exponential Functions

646 ANS:
\[
2(x + 3)(x - 4) + 2(5)(x - 4) + 2(x + 3)(5) \\
2(x^2 - 4x + 3x - 12) + 10(x - 4) + 10(x + 3) \\
2x^2 - 2x - 24 + 10x - 40 + 10x + 30 \\
2x^2 + 18x - 34
\]

PTS: 3 REF: 061136ia STA: A.G.2 TOP: Surface Area

647 ANS:
(1,A), (1,B), (1,C), (3,A), (3,B), (3,C), (5,A), (5,B), (5,C), (7,A), (7,B), (7,C), (9,A), (9,B), (9,C).

PTS: 3 REF: 011334ia STA: A.S.19 TOP: Sample Space

648 ANS:
\[
\left| \frac{(24.2 \times 14.1) - (24 \times 14)}{(24.2 \times 14.1)} \right| = \frac{5.22}{341.22} \approx 0.015
\]

PTS: 3 REF: 011336ia STA: A.M.3 TOP: Error
KEY: area
Integrated Algebra 4 Point Regents Exam Questions
Answer Section

649 ANS:

PTS: 4 REF: 080939ia STA: A.S.5 TOP: Box-and-Whisker Plots

650 ANS:

\[ \frac{4}{12} \times \frac{2}{11} \times \frac{1}{10} = \frac{8}{1320} \]
\[ \frac{6}{12} \times \frac{5}{10} \times \frac{4}{11} \times \frac{4}{10} = \frac{24}{1320} \]
\[ \frac{3}{11} \times \frac{2}{10} = \frac{120}{1320} \]

\[
\begin{align*}
\frac{8}{1320} + \frac{24}{1320} + \frac{120}{1320} &= \frac{144}{1320} \\
&= \frac{12}{110} \times 12 \\
&= \frac{144}{1320} \\
&= \frac{23}{220} \\
&= 1.07
\end{align*}
\]

PTS: 4 REF: 081137ia STA: A.S.23 TOP: Theoretical Probability
KEY: dependent events

651 ANS:

\[ 259.99 \times 1.07 - 259.99(1 - 0.3) \times 1.07 = 83.46 \]

PTS: 4 REF: 011239ia STA: A.N.5 TOP: Percents

652 ANS:

\[
\frac{x^2 + 9x + 14}{x^2 - 49} + \frac{3x + 6}{x^2 + x - 56} = \frac{(x + 7)(x + 2)}{(x + 7)(x - 7)} \cdot \frac{(x + 8)(x - 7)}{3(x + 2)} = \frac{x + 8}{3}
\]

PTS: 4 REF: 061037ia STA: A.A.18 TOP: Multiplication and Division of Rationals
KEY: division

653 ANS:

\[ 26 \times 25 \times 24 \times 23 = 358,800 \] 10^6 = 1,000,000. Use the numeric password since there are over 500,000 employees

PTS: 4 REF: 061239ia STA: A.N.8 TOP: Permutations

654 ANS:

\((H,F,M), (H,F,J), (H,F,S), (H,A,M), (H,A,J), (H,A,S), (C,F,M), (C,F,J), (C,F,S), (C,A,M), (C,A,J), (C,A,S), (T,F,M), (T,F,J), (T,F,S), (T,A,M), (T,A,J), (T,A,S)\). There are 18 different kids’ meals, 12 do not include juice and 6 include chicken nuggets.

PTS: 4 REF: 010939ia STA: A.S.19 TOP: Sample Space
\[
\frac{m}{5} + \frac{3(m-1)}{2} = 2(m-3)
\]
\[
\frac{2m}{10} + \frac{15(m-1)}{10} = 2m - 6
\]
\[
\frac{17m - 15}{10} = 2m - 6
\]
\[
17m - 15 = 20m - 60
\]
\[
45 = 3m
\]
\[
15 = m
\]

PTS: 4  REF: 081139ia  STA: A.A.25
TOP: Solving Equations with Fractional Expressions

\[
\begin{align*}
\text{pts: } & 4 \\
\text{ref: } & 081337ia \\
\text{sta: } & A.G.9
\end{align*}
\]
TOP: Quadratic-Linear Systems

\[
\frac{[2\pi(5.1)^2 + 2\pi(5.1)(15.1)] - [2\pi(5)^2 + 2\pi(5)(15)]}{2\pi(5.1)^2 + 2\pi(5.1)(15.1)} \approx \frac{647.294 - 628.319}{647.294} \approx 0.029
\]

PTS: 4  REF: 011137ia  STA: A.M.3
TOP: Error
KEY: volume and surface area

\[
(-2, 5): \quad 3x + 2y = 4 \quad 12x + 8y = 16 \quad 3x + 2y = 4
\]
\[
4x + 3y = 7 \quad 12x + 9y = 21 \quad 3x + 2(5) = 4
\]
\[
y = 5 \quad 3x = -6 \quad x = -2
\]

PTS: 4  REF: 010937ia  STA: A.A.10
TOP: Solving Linear Systems
659 ANS:

\[
\begin{align*}
\tan 48 &= \frac{9}{x}, \quad \sin 48 = \frac{9}{y} \\
x &\approx 8 \\
y &\approx 12
\end{align*}
\]

PTS: 4  REF: 010938ia  STA: A.G.7  TOP: Systems of Linear Inequalities

660 ANS:

\[
\begin{align*}
\tan 48 &= \frac{9}{x}, \quad \sin 48 = \frac{9}{y} \\
x &\approx 8 \\
y &\approx 12
\end{align*}
\]

PTS: 4  REF: 011338ia  STA: A.A.44  TOP: Using Trigonometry to Find a Side

661 ANS:

\[
\begin{align*}
84, 71 \\
\sin 50 &= \frac{x}{110}, \quad \cos 50 = \frac{y}{110} \\
x &\approx 84 \\
y &\approx 71
\end{align*}
\]

PTS: 4  REF: fall0738ia  STA: A.G.9  TOP: Quadratic-Linear Systems

662 ANS:

\((C, B, T), (C, B, 5), (C, N, T), (C, N, 5), (C, 2, T), (C, 2, 5), (F, B, T), (F, B, 5), (F, N, T), (F, N, 5), (F, 2, T), (F, 2, 5)\).

PTS: 4  REF: 081237ia  STA: A.S.19  TOP: Sample Space

663 ANS:

\[
\begin{align*}
84, 71 \\
\sin 50 &= \frac{x}{110}, \quad \cos 50 = \frac{y}{110} \\
x &\approx 84 \\
y &\approx 71
\end{align*}
\]

PTS: 4  REF: 081039ia  STA: A.A.44  TOP: Using Trigonometry to Find a Side

39, 63. \[ \tan 52 = \frac{50}{x} \quad \sin 52 = \frac{50}{x} \]
\[ x \approx 39 \quad x \approx 63 \]


\[ \frac{-9}{4} \quad \frac{3}{4} = \frac{-x + 11}{4x} + \frac{1}{2x} \]
\[ \frac{3}{4} = \frac{-x - 11}{4x} \quad \frac{2}{4x} \]
\[ \frac{3}{4} = \frac{-x - 9}{4x} \]
\[ 12x = -4x - 36 \]
\[ 16x = -36 \]
\[ x = \frac{-9}{4} \]

54, 23. \[ \cos A = \frac{17}{29} \quad \sqrt{29^2 - 17^2} \approx 23 \]
\[ x = 54 \]

5m = 50¢, p = 15¢. 3m + 2p = 1.80. 9m + 6p = 5.40. 4(.50) + 6p = 2.90
\[ 4m + 6p = 2.90 \quad 4m + 6p = 2.90 \quad 6p = .90 \]
\[ 5m = 2.50 \quad p = .015 \]
\[ m = .05 \]

PTS: 4 REF: 081238ia STA: A.A.7 TOP: Writing Linear Systems
\[
\frac{2}{3x} + \frac{12}{3x} = \frac{7}{x + 1}
\]
\[
\frac{14}{3x} = \frac{7}{x + 1}
\]
\[21x = 14x + 14\]
\[7x = 14\]
\[x = 2\]

PTS: 4  REF: 061337ia  STA: A.A.26  TOP: Solving Rationals

ANS:
24,435.19. 30000(.95)^4 \approx 24435.19

PTS: 4  REF: 011138ia  STA: A.A.9  TOP: Exponential Functions

ANS:
15,600,000, 4,368,000. 10 \times 10 \times 10 \times 26 \times 25 \times 24 = 15,600,000. 10 \times 9 \times 8 \times 26 \times 25 \times 24 = 11,232,000. 15,600,000 - 11,232,000 = 4,368,000.

PTS: 4  REF: 011037ia  STA: A.N.8  TOP: Permutations

ANS:

<table>
<thead>
<tr>
<th>Number of Days Outside</th>
<th>Interval</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
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<tr>
<td>0–1</td>
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<td>3</td>
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<tr>
<td>2–3</td>
<td>1111</td>
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<td>4–5</td>
<td>11111</td>
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<tr>
<td>6–7</td>
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<table>
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<tr>
<td>0–7</td>
<td>20</td>
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</tbody>
</table>

PTS: 4  REF: 080838ia  STA: A.S.5  TOP: Frequency Histograms, Bar Graphs and Tables  KEY: cumulative frequency histograms
674 ANS:

\[
\begin{align*}
&\text{A line graph with two points: (1.5, 6.4) and (5, 0).}
\end{align*}
\]

PTS: 4 REF: 081138ia STA: A.G.9 TOP: Quadratic-Linear Systems

675 ANS:

\[
\begin{align*}
&\text{A system of linear inequalities graphed on a coordinate plane.}
\end{align*}
\]

PTS: 4 REF: 081239ia STA: A.G.7 TOP: Systems of Linear Inequalities

676 ANS:

\[
\begin{align*}
&618.45, 613.44, 0.008. \quad 21.7 \times 28.5 = 618.45. \quad 21.6 \times 28.4 = 613.44. \quad \left| \frac{618.45 - 613.44}{613.44} \right| \approx 0.008. \quad \text{An error of less than 1\% would seem to be insignificant.}
\end{align*}
\]

PTS: 4 REF: 060838ia STA: A.M.3 TOP: Error

677 ANS:

\[
\begin{align*}
&315,000, 180,000, \text{ the median better represents value since it is closer to more prices than the mean.}
\end{align*}
\]

PTS: 4 REF: 060839ia STA: A.S.4 TOP: Frequency Histograms, Bar Graphs and Tables

678 ANS:

\[
\begin{align*}
&225000, 175000, \text{ the median better represents the value since it is closer to more values than the mean.}
\end{align*}
\]

PTS: 4 REF: fall0737ia STA: A.S.4 TOP: Frequency Histograms, Bar Graphs and Tables
680 ANS:

\[
\frac{x + 1}{x} = \frac{-7}{x - 12}
\]

\[(x + 1)(x - 12) = -7x\]

\[x^2 - 11x - 12 = -7x\]

\[x^2 - 4x - 12 = 0\]

\[(x - 6)(x + 2) = 0\]

\[x = 6 \text{ or } -2\]

PTS: 4  REF: fall0739ia  STA: A.A.26  TOP: Solving Rationals

681 ANS:

\[
\frac{3x(x + 3)}{(x + 3)(x + 2)} \times \frac{(x - 3)(x + 2)}{(x + 3)(x - 3)} = \frac{3x}{x + 3}
\]

PTS: 4  REF: 081338ia  STA: A.A.18  TOP: Multiplication and Division of Rationals

KEY: division
682 ANS:
6, 8, 10. Three consecutive even integers are \( x, x + 2 \) and \( x + 4 \). \( (x + 2)(x + 4) = 10x + 20 \)

\[
x^2 + 6x + 8 = 10x + 20
\]

\[
x^2 - 4x - 12 = 0
\]

\[
(x - 6)(x + 2) = 0
\]

\[
x = 6
\]

PTS: 4 REF: 011039ia STA: A.A.8 TOP: Writing Quadratics

683 ANS:

\[
\frac{x - 7}{3x} \cdot \frac{2x^2 - 8x - 42}{6x^2} \div \frac{x^2 - 9}{x^2 - 3x} = \frac{2(x^2 - 4x - 21)}{6x^2} \cdot \frac{x(x - 3)}{(x + 3)(x - 3)} = \frac{(x - 7)(x + 3)}{3x} \cdot \frac{1}{x + 3} = \frac{x - 7}{3x}
\]

PTS: 4 REF: 080937ia STA: A.A.18 TOP: Multiplication and Division of Rationals

KEY: division

684 ANS:
4. \( 3(x + 1) - 5x = 12 - (6x - 7) \)

\[
3x + 3 - 5x = 12 - 6x + 7
\]

\[
-2x + 3 = -6x + 19
\]

\[
4x = 16
\]

\[
x = 4
\]

PTS: 4 REF: 061238ia STA: A.A.22 TOP: Solving Equations

685 ANS:

PTS: 4 REF: 080839ia STA: A.G.9 TOP: Quadratic-Linear Systems
7, 9, 11. \( x + (x + 2) + (x + 4) = 5(x + 2) - 18 \)
\[ 3x + 6 = 5x - 8 \]
\[ 14 = 2x \]
\[ 7 = x \]

\[ \frac{5}{8} \times \frac{3}{7} = \frac{15}{56} \]
\[ \frac{5}{8} \times \frac{4}{7} = \frac{20}{56} \]
\[ \frac{3}{8} \times \frac{2}{7} = \frac{6}{56} \]

Hat \( A \), add 1 not green to Hat \( A \), add 11 green to Hat \( B \), and add none to Hat \( C \).

Area of rectangle minus area of semicircle:
\[ (5 + 6 + 5) \times 5 - \frac{\pi \times 3^2}{2} \approx 65.86 \]

\((1, -3)\) is in the solution set.
\[ 4(1) - 3(-3) > 9 \]
\[ 4 + 9 > 9 \]
691  ANS:  
\[ w(w + 15) = 54,\ 3,\ 18.\quad w(w + 15) = 54 \]
\[ w^2 + 15w - 54 = 0 \]
\[ (w + 18)(w - 3) = 0 \]
\[ w = 3 \]

PTS: 4  REF: 060837ia  STA: A.A.8  TOP: Geometric Applications of Quadratics

692  ANS:  
Carol’s, by 14.9.  \[ V_M = 5 \times 3.5 \times 7 = 122.5.\quad V_C = \pi \times 2.5^2 \times 7 \approx 137.4.\quad 137.4 - 122.5 = 14.9 \]

PTS: 4  REF: 061237ia  STA: A.G.2  TOP: Volume

693  ANS:  

PTS: 4  REF: 081037ia  STA: A.G.7  TOP: Systems of Linear Inequalities

694  ANS:  

PTS: 4  REF: 011337ia  STA: A.S.5  TOP: Box-and-Whisker Plots

695  ANS:  
\[ \frac{12}{20} \times \frac{8}{19} + \frac{8}{20} \times \frac{12}{19} = \frac{192}{380}.\quad 1 - P(BB) = 1 - \left( \frac{8}{20} \times \frac{7}{19} \right) = \frac{380}{380} - \frac{56}{380} = \frac{324}{380} \]

PTS: 4  REF: 081339ia  STA: A.S.23  TOP: Theoretical Probability

KEY: dependent events

696  ANS:  
30, 20, 71-80, 81-90 and 91-100

PTS: 4  REF: 061038ia  STA: A.S.9  TOP: Frequency Histograms, Bar Graphs and Tables
697 ANS:

PTS: 4    REF: 061039ia    STA: A.G.9    TOP: Quadratic-Linear Systems

698 ANS:

PTS: 4    REF: 060939ia    STA: A.G.9    TOP: Quadratic-Linear Systems

699 ANS:

PTS: 4    REF: 011339ia    STA: A.G.9    TOP: Quadratic-Linear Systems
700 ANS:

![Graph showing lines intersecting at point (2,5)]

PTS: 4 REF: 080938ia STA: A.G.7 TOP: Solving Linear Systems

701 ANS:

![Frequency Histogram, Bar Graphs and Tables]

PTS: 4 REF: 060938ia STA: A.S.5 TOP: Frequency Histograms, Bar Graphs and Tables KEY: frequency histograms

702 ANS:

![Graph showing lines intersecting at point (2,5)]

PTS: 4 REF: 061139ia STA: A.G.7 TOP: Systems of Linear Inequalities