Dear Sir,

I have to acknowledge the receipt of your favor of May 14, in which you mention that you have finished the 6. first books of Euclid, plane trigonometry, surveying & algebra and ask whether I think a further pursuit of that branch of science would be useful to you. There are some propositions in the latter books of Euclid, & some of Archimedes, which are useful, & I have no doubt you have been made acquainted with them. Trigonometry, so far as this, is most valuable to every man, there is scarcely a day in which he will not resort to it for some of the purposes of common life. The science of calculation also is indispensable as far as the extraction of the square & cube roots; Algebra as far as the quadratic equation & the use of logarithms are often of value in ordinary cases: but all beyond these is but a luxury; a delicious luxury indeed; but not to be indulged in by one who is to have a profession to follow for his subsistence. In this light I view the conic sections, curves of the higher orders, perhaps even spherical trigonometry, Algebraical operations beyond the 2d dimension, and fluxions.

Letter from Thomas Jefferson to William G. Munford, Monticello, June 18, 1799.
Integrated Algebra Multiple Choice Regents Exam Questions
Answer Section

1 ANS: 4 REF: fall0717ia STA: A.G.4 TOP: Families of Functions

2 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

3 ANS: 4

\[ 16^2 + b^2 = 34^2 \]
\[ b^2 = 900 \]
\[ b = 30 \]

REF: 080809ia STA: A.A.45 TOP: Pythagorean Theorem

4 ANS: 4

\[ \frac{2x}{5} + \frac{1}{3} = \frac{7x - 2}{15} \]
\[ \frac{(2x \times 3) + (5 \times 1)}{5 \times 3} = \frac{7x - 2}{15} \]
\[ \frac{6x + 5}{15} = \frac{7x - 2}{15} \]
\[ 6x + 5 = 7x - 2 \]
\[ x = 7 \]

REF: 080820ia STA: A.A.25 TOP: Solving Equations with Fractional Expressions

5 ANS: 2 REF: 010909ia STA: A.A.19 TOP: Factoring the Difference of Perfect Squares

6 ANS: 4 REF: fall0729ia STA: A.A.2 TOP: Expressions

7 ANS: 3 REF: fall0705ia STA: A.N.1 TOP: Identifying Properties

8 ANS: 1 REF: 010905ia STA: A.G.4 TOP: Families of Functions
\( x^2 - 2 = x \) \quad \text{Since} \ y = x, \ \text{the solutions are} \ (2, 2) \ \text{and} \ (-1, -1). \\
\( x^2 - x - 2 = 0 \)

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

\( x = 2 \) \ or \ \(-1\)

10 \ ANS: 3

\( \frac{(2x^3)(8x^5)}{4x^6} = \frac{16x^8}{4x^6} = 4x^2 \)

11 \ ANS: 4

\( \frac{\text{344 m}}{\text{sec}} \times \frac{\text{60 sec}}{\text{1 min}} \times \frac{\text{60 min}}{\text{1 hr}} = 1,238,400 \text{ m/hr} \)

12 \ ANS: 2

13 \ ANS: 4

\( A = \{2, 4, 6, 8, 10, 12, 14, 16, 18, 20\} \)

14 \ ANS: 1

\( x^2 + 7x + 10 = 0 \)

\( (x + 5)(x + 2) = 0 \)

\( x = -5 \) \ or \ \(-2\)

15 \ ANS: 2

\( \frac{6}{4a} - \frac{2}{3a} = \frac{18a - 8a}{12a^2} = \frac{10a}{12a^2} = \frac{5}{6a} \)

16 \ ANS: 1

REF: 060810ia \ STA: A.A.11 \ TOP: Quadratic-Linear Systems

REF: fall0703ia \ STA: A.A.12 \ TOP: Division of Powers

REF: 060911ia \ STA: A.M.2 \ TOP: Conversions

REF: 080810ia \ STA: A.A.36 \ TOP: Parallel and Perpendicular Lines

REF: 080912ia \ STA: A.A.30 \ TOP: Set Theory

REF: 080918ia \ STA: A.A.15 \ TOP: Undefined Rationals

REF: 060929ia \ STA: A.A.17 \ TOP: Addition and Subtraction of Rationals

REF: 060807ia \ STA: A.A.13 \ TOP: Multiplication of Polynomials
17 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

18 ANS: 4
$x^2 - 7x + 6 = 0$
$(x - 6)(x - 1) = 0$
$x = 6 \quad x = 1$

REF: 060902ia STA: A.A.28 TOP: Roots of Quadratics

19 ANS: 1
$x - 2y = 1$
$x + 4y = 7$
$-6y = -6$
$y = 1$

REF: 080920ia STA: A.A.10 TOP: Solving Linear Systems

20 ANS: 4
REF: 060927ia STA: A.N.4 TOP: Operations with Scientific Notation

21 ANS: 3
$|-5(5) + 12| = |-13| = 13$

REF: 080923ia STA: A.N.6 TOP: Evaluating Expressions

22 ANS: 1
$\sqrt{\frac{32}{4}} = \sqrt{\frac{16 \cdot 2}{4}} = \sqrt{2}$

REF: 060828ia STA: A.N.2 TOP: Simplifying Radicals

23 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

24 ANS: 1
$\frac{1}{8} \times \frac{1}{8} = \frac{1}{64}$

REF: 010928ia STA: A.S.23 TOP: Geometric Probability
25 ANS: 4

\[ \frac{2^6}{2^1} = 2^5 \]

REF: 060813ia STA: A.A.12 TOP: Division of Powers

26 ANS: 3

REF: 060924ia STA: A.G.8 TOP: Solving Quadratics by Graphing

27 ANS: 4

REF: 060916ia STA: A.A.15 TOP: Undefined Rationals

28 ANS: 2

If the car can travel 75 miles on 4 gallons, it can travel 300 miles on 16 gallons.

\[ \frac{75}{4} = \frac{x}{16} \]

\[ x = 300 \]

REF: 080807ia STA: A.G.4 TOP: Graphing Linear Functions

29 ANS: 4

\[ 5p - 1 = 2p + 20 \]

\[ 3p = 21 \]

\[ p = 7 \]

REF: 080801ia STA: A.A.22 TOP: Solving Equations

30 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

31 ANS: 2

1.5^3 = 3.375

REF: 060809ia STA: A.G.2 TOP: Volume

32 ANS: 1

To determine student interest, survey the widest range of students.

REF: 060803ia STA: A.S.3 TOP: Analysis of Data

33 ANS: 4

REF: 010908ia STA: A.A.9 TOP: Exponential Functions

34 ANS: 4

REF: fall0715ia STA: A.A.5 TOP: Modeling Inequalities

35 ANS: 3

The number of correct answers on a test causes the test score.

REF: 080908ia STA: A.S.13 TOP: Analysis of Data
36 ANS: 2

\[ x^2 - x - 20 = 3x - 15, \quad y = 3x - 15. \]

\[ x^2 - 4x - 6 = 0 = 3(-1) - 15 \]

\[(x = 5)(x + 1) = 0 = -18 \]

\[ x = 5 \text{ or } -1 \]

REF: 010922ia STA: A.A.11 TOP: Quadratic-Linear Systems

37 ANS: 3

REF: 060926ia STA: A.N.1 TOP: Properties of Reals

38 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

39 ANS: 2

The events are not mutually exclusive: \( P(\text{prime}) = \frac{3}{6}, P(\text{even}) = \frac{3}{6}, P(\text{prime AND even}) = \frac{1}{6} \)

\[ P(\text{prime OR even}) = \frac{3}{6} + \frac{3}{6} - \frac{1}{6} = \frac{5}{6} \]

REF: 080830ia STA: A.S.23 TOP: Theoretical Probability

KEY: not mutually exclusive events

40 ANS: 2

\[ \frac{6}{5x} - \frac{2}{3x} = \frac{18x - 10x}{15x^2} = \frac{8x}{15x^2} = \frac{8}{15x} \]

REF: 010921ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

41 ANS: 2

REF: 060908ia STA: A.S.21 TOP: Empirical Probability
42 ANS: 2

\[ l(l - 5) = 24 \]
\[ l^2 - 5l - 24 = 0 \]
\[ (l - 8)(l + 3) = 0 \]
\[ l = 8 \]

REF: 080817ia STA: A.A.8 TOP: Geometric Applications of Quadratics

43 ANS: 2

\[ \frac{3}{5}(x + 2) = x - 4 \]
\[ 3(x + 2) = 5(x - 4) \]
\[ 3x + 6 = 5x - 20 \]
\[ 26 = 2x \]
\[ x = 13 \]

REF: 080909ia STA: A.A.25 TOP: Solving Equations with Fractional Expressions

44 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

45 ANS: 1

REF: 080803ia STA: A.A.4 TOP: Modeling Inequalities

46 ANS: 1

\[ \left| \frac{289 - 282}{289} \right| \approx 0.024 \]

REF: 080828ia STA: A.M.3 TOP: Error KEY: volume and surface area

47 ANS: 3

REF: 060808ia STA: A.N.8 TOP: Permutations

48 ANS: 3

\[ F = \frac{9}{5}C + 32 = \frac{9}{5}(15) + 32 = 59 \]

REF: 010901ia STA: A.M.2 TOP: Conversions

49 ANS: 4

REF: fall0704ia STA: A.A.29 TOP: Set Theory

50 ANS: 4

\[ \frac{\text{distance}}{\text{time}} = \frac{24}{6} = 4 \]

REF: 010902ia STA: A.M.1 TOP: Speed
51 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

52 ANS: 4
\[ V = \pi r^2 h = \pi \cdot 6^2 \cdot 15 \approx 1696.5 \]

REF: fall0712ia STA: A.G.2 TOP: Volume

53 ANS: 3
\[ 3ax + b = c \]
\[ 3ax = c - b \]
\[ x = \frac{c - b}{3a} \]

REF: 080808ia STA: A.A.23 TOP: Transforming Formulas

54 ANS: 2
\[ 5\sqrt{20} = 5\sqrt{4 \cdot 5} = 10\sqrt{5} \]

REF: 080922ia STA: A.N.2 TOP: Simplifying Radicals

55 ANS: 1
\[ 4P_4 = 4 \times 3 \times 2 \times 1 = 24 \]

REF: 080816ia STA: A.N.8 TOP: Permutations

56 ANS: 3
\[ \cos 30 = \frac{x}{24} \]
\[ x \approx 21 \]

REF: 010912ia STA: A.A.44 TOP: Using Trigonometry to Find a Side

57 ANS: 3
\[ x^2 - 6x = 0 \]
\[ x(x - 6) = 0 \]
\[ x = 0 \quad x = 6 \]

REF: 080921ia STA: A.A.27 TOP: Solving Quadratics by Factoring

58 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
59 ANS: 4
\[
\frac{5}{45} = \frac{8}{x}
\]
\[5x = 360\]
\[x = 72\]

REF: 060901ia STA: A.M.1 TOP: Speed

60 ANS: 1

REF: 080813ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph

61 ANS: 2

REF: 060821ia STA: A.A.5 TOP: Modeling Inequalities

62 ANS: 3

REF: 080819ia STA: A.A.13 TOP: Addition and Subtraction of Polynomials

KEY: subtraction

63 ANS: 4
\[
\frac{x^2 - 1}{x + 1} = \frac{x + 3}{3x - 3} = \frac{(x + 1)(x - 1)}{x + 1} = \frac{x + 3}{3(x - 1)} = \frac{x + 3}{3}
\]

REF: 060815ia STA: A.A.18 TOP: Multiplication and Division of Rationals

64 ANS: 4

REF: 060829ia STA: A.G.5 TOP: Graphing Quadratic Functions

65 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

66 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

67 ANS: 3
\[
500(1 + 0.06)^1 \approx 596
\]

REF: 080929ia STA: A.A.9 TOP: Exponential Functions

68 ANS: 3
\[
3^2 + 5^2 = x^2
\]
\[34 = x^2
\]
\[\sqrt{34} = x
\]

REF: 060909ia STA: A.A.45 TOP: Pythagorean Theorem

69 ANS: 3

REF: 010917ia STA: A.A.29 TOP: Set Theory
70 ANS: 2
\[ L + S = 47 \]
\[ L - S = 15 \]
\[ 2L = 62 \]
\[ L = 31 \]

REF: 060912ia STA: A.A.7 TOP: Writing Linear Systems

71 ANS: 3
0.75 hours = 45 minutes. \[ \frac{120}{1} = \frac{x}{45} \]
\[ x = 5400 \]

REF: 080814ia STA: A.M.1 TOP: Using Rate

72 ANS: 1
The slope of both is \(-4\).

REF: 060814ia STA: A.A.38 TOP: Parallel and Perpendicular Lines

73 ANS: 2
\[ \left| \frac{149.6 - 174.2}{149.6} \right| \approx 0.1644 \]

REF: 080926ia STA: A.M.3 TOP: Error KEY: area

74 ANS: 1
A rooster crows before sunrise, not because of the sun.

REF: fall0707ia STA: A.S.14 TOP: Analysis of Data

75 ANS: 3
\[ (3 - 1) \times 2 \times 3 = 12 \]

REF: 080905ia STA: A.N.7 TOP: Conditional Probability

76 ANS: 3
mean = 6, median = 6 and mode = 7

REF: 080804ia STA: A.S.4 TOP: Central Tendency

77 ANS: 2 REF: 010915ia STA: A.A.5 TOP: Modeling Equations

78 ANS: 4
\[ P(O) = \frac{3}{6}, P(E) = \frac{3}{6}, P(< 6) = \frac{5}{6}, P(> 4) = \frac{2}{6} \]

REF: 010903ia STA: A.S.22 TOP: Theoretical Probability

79 ANS: 3 REF: 010910ia STA: A.A.35 TOP: Writing Linear Equations

80 ANS: 3
The other situations are quantitative.

REF: 060905ia STA: A.S.1 TOP: Analysis of Data
81 ANS: 2
\[
\sin A = \frac{8}{12}
\]
\[
A \approx 42
\]

REF: 060816ia STA: A.A.43 TOP: Using Trigonometry to Find an Angle

82 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

83 ANS: 2

KEY: area

84 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

85 ANS: 4

REF: 010929ia STA: A.S.6 TOP: Box-and-Whisker Plots

86 ANS: 3
\[
m = \frac{1 - (-4)}{-6 - 4} = \frac{1}{2}
\]

REF: 060820ia STA: A.A.33 TOP: Slope

87 ANS: 3

REF: 010914ia STA: A.A.28 TOP: Roots of Quadratics

88 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

89 ANS: 3
\[
m = \frac{4 - 10}{3 - (-6)} = \frac{2}{3}
\]

REF: fall0716ia STA: A.A.33 TOP: Slope

90 ANS: 2
\]
\[
x + 2y = 9
\]
\[
x - y = 3
\]
\[
3y = 6
\]
\[
y = 2
\]

REF: 060925ia STA: A.A.10 TOP: Solving Linear Systems
91 ANS: 3
An element of the domain, 1, is paired with two different elements of the range, 3 and 7.

REF: 080919ia STA: A.G.3 TOP: Defining Functions

92 ANS: 4
REF: 060930ia STA: A.A.29 TOP: Set Theory

93 ANS: 2
REF: fall0725ia STA: A.N.4 TOP: Operations with Scientific Notation

94 ANS: 1
REF: fall0723ia STA: A.M.3 TOP: Error

KEY: area

95 ANS: 4

\[ y = mx + b \]

\[-1 = (2)(3) + b \]

\[ b = -7 \]

REF: 080927ia STA: A.A.34 TOP: Writing Linear Equations

96 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

97 ANS: 3
REF: 080907ia STA: A.S.20 TOP: Geometric Probability

98 ANS: 4
REF: 010930ia STA: A.G.3 TOP: Defining Functions

99 ANS: 3

\[ a + ar = b + r \]

\[ a(1 + r) = b + r \]

\[ a = \frac{b + r}{1 + r} \]

REF: 060913ia STA: A.A.23 TOP: Transforming Formulas

100 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

101 ANS: 1
REF: 080824ia STA: A.A.43 TOP: Using Trigonometry to Find an Angle

102 ANS: 4

The transformation is a reflection in the x-axis.

REF: fall0722ia STA: A.G.5 TOP: Graphing Absolute Value Functions

103 ANS: 2

\[ \sin U = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{15}{17} \]

REF: 010919ia STA: A.A.42 TOP: Trigonometric Ratios
104 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

105 ANS: 2 REF: 010925ia STA: A.A.15 TOP: Undefined Rationals

106 ANS: 3 REF: 060825ia STA: A.A.45 TOP: Pythagorean Theorem

107 ANS: 2 REF: 060830ia STA: A.A.9 TOP: Exponential Functions

108 ANS: 3 REF: 060919ia STA: A.G.3 TOP: Defining Functions

109 ANS: 4 REF: 060906ia STA: A.A.4 TOP: Modeling Inequalities

110 ANS: 4 REF: fall0730ia STA: A.G.3 TOP: Defining Functions

111 ANS: 4

Let \( x = \) youngest brother and \( x + 4 = \) oldest brother. \( 3x - (x + 4) = 48. \)

\[
2x - 4 = 48
\]

\[
x = 26
\]

REF: 080928ia STA: A.A.6 TOP: Modeling Equations

112 ANS: 3 REF: 080925ia STA: A.G.4 TOP: Identifying the Equation of a Graph

113 ANS: 2

\[
P = 2l + 2w
\]

\[
P - 2l = 2w
\]

\[
\frac{P - 2l}{2} = w
\]

REF: 010911ia STA: A.A.23 TOP: Transforming Formulas

114 ANS: 1

The slope of \( y = 3 - 2x \) is \(-2\). Using \( m = \frac{A}{B} \), the slope of \( 4x + 2y = 5 \) is \( \frac{4}{2} = -2 \).

REF: 010926ia STA: A.A.38 TOP: Parallel and Perpendicular Lines

12
\[
\frac{25x - 125}{x^2 - 25} = \frac{25(x - 5)}{(x + 5)(x - 5)} = \frac{25}{x + 5}
\]

REF: 080821ia STA: A.A.16 TOP: Rational Expressions

KEY: \(a > 0\)

\[
\frac{3}{2x} + \frac{4}{3x} = \frac{9x + 8x}{6x^2} = \frac{17x}{6x^2} = \frac{17}{6x}
\]

REF: 080917ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

\[
3.95 + 0.49s \leq 50.00
\]

\[
0.49s \leq 36.05
\]

\[s \leq 73.57\]

REF: 080904ia STA: A.A.6 TOP: Modeling Inequalities

\[
s + o = 126, s + 2s = 126
\]

\[o = 2s, s = 42\]

REF: 080811ia STA: A.A.7 TOP: Writing Linear Systems

\[
\text{The volume of the cube using Ezra’s measurements is } 8 \ (2^3). \ 	ext{The actual volume is } 9.261 \ (2.13^3). \ 	ext{The relative error is } \left| \frac{9.261 - 8}{9.261} \right| \approx 0.14.
\]

REF: 060928ia STA: A.M.3 TOP: Error KEY: volume and surface area

\[
\text{ANS: 4}
\]

\[
\text{ANS: 2}
\]

\[
\text{ANS: 1}
\]

\[
\text{ANS: 2}
\]

\[
\text{ANS: 3}
\]

\[
\text{ANS: 2}
\]

\[
\text{ANS: 3}
\]

\[
\text{ANS: 2}
\]

\[
\text{ANS: 2}
\]

\[
\text{ANS: 2}
\]
\[ \sin A = \frac{10}{16} \quad B = 180 - (90 = 38.7) = 51.3 \quad \text{A 90° angle is not acute.} \]

\[ A \approx 38.7 \]

REF: 080829ia STA: A.A.43 TOP: Using Trigonometry to Find an Angle

129 ANS: 4

\[ 25(x - 3) = 25x - 75 \]

REF: 060823ia STA: A.A.1 TOP: Expressions

130 ANS: 1

REF: 060804ia STA: A.A.19 TOP: Factoring the Difference of Perfect Squares

131 ANS: 2

\[ \tan 32 = \frac{x}{25} \]

\[ x \approx 15.6 \]

REF: 080914ia STA: A.A.44 TOP: Using Trigonometry to Find a Side

132 ANS: 4

\[ A = lw = (3w - 7)(w) = 3w^2 - 7w \]

REF: 010924ia STA: A.A.1 TOP: Expressions

133 ANS: 3

\[ 25 - 18 = 7 \]

REF: 060822ia STA: A.S.9 TOP: Frequency Histograms, Bar Graphs and Tables

134 ANS: 1

\[ y = mx + b \]

\[ -6 = (-3)(4) + b \]

\[ b = 6 \]

REF: 060922ia STA: A.A.34 TOP: Writing Linear Equations

135 ANS: 1

\[ m = \frac{3 - 0}{0 - 2} = \frac{3}{2} \quad \text{Using the given y-intercept (0,3) to write the equation of the line } y = \frac{3}{2}x + 3. \]

REF: fall0713ia STA: A.A.35 TOP: Writing Linear Equations

136 ANS: 2

REF: fall0701ia STA: A.S.7 TOP: Scatter Plots

137 ANS: 3

The other situations are quantitative.

REF: 060819ia STA: A.S.1 TOP: Analysis of Data
138 ANS: 1
\[-2x + 5 > 17\]
\[-2x > 12\]
\[x < -6\]

REF: fall0724ia  STA: A.A.21  TOP: Interpreting Solutions

139 ANS: 1  REF: 080911ia  STA: A.A.36  TOP: Parallel and Perpendicular Lines

140 ANS: 4  REF: 080825ia  STA: A.A.40  TOP: Systems of Linear Inequalities

141 ANS: 1  REF: 060920ia  STA: A.G.6  TOP: Linear Inequalities

142 ANS: 1
so = f + 60   j = 2f - 50   se = 3f.  \[f + (f + 60) + (2f - 50) + 3f = 1424\]
\[7f + 10 = 1424\]
\[f = 202\]

REF: 060917ia  STA: A.A.7  TOP: Writing Linear Systems

143 ANS: 1  REF: 060903ia  STA: A.A.12  TOP: Division of Powers

144 ANS: 1
\[8^2 + 15^2 = c^2\]
\[c^2 = 289\]
\[c = 17\]

REF: 080906ia  STA: A.A.45  TOP: Pythagorean Theorem

145 ANS: 4
\[-2(x - 5) < 4\]
\[-2x + 10 < 4\]
\[-2x < -6\]
\[x > 3\]

REF: 080913ia  STA: A.A.21  TOP: Interpreting Solutions

146 ANS: 3
\[b = 42 - r\]  \[r = 2b + 3\]
\[r = 2b + 3\]  \[r = 2(42 - r) + 3\]
\[r = 84 - 2r + 3\]
\[3r = 87\]
\[r = 29\]

REF: 060812ia  STA: A.A.7  TOP: Writing Linear Systems

147 ANS: 1  REF: 080902ia  STA: A.A.19  TOP: Factoring the Difference of Perfect Squares
The value of the upper quartile is the last vertical line of the box.

REF: 060915ia  STA: A.S.6  TOP: Box-and-Whisker Plots

ANS: 4

5x + 2y = 48
3x + 2y = 32

2x = 16

x = 8

REF: fall0780ia  STA: A.A.10  TOP: Solving Linear Systems


ANS: 1  REF: 060801ia  STA: A.G.4  TOP: Families of Functions

ANS: 4  REF: 060805ia  STA: A.S.12  TOP: Scatter Plots

ANS: 4

\[
\frac{(d \times 3) + (2 \times 2d)}{2 \times 3} = \frac{3d + 4d}{6} = \frac{7d}{6}
\]

REF: fall0727ia  STA: A.A.17  TOP: Addition and Subtraction of Rationals

ANS: 2  REF: 080802ia  STA: A.N.1  TOP: Identifying Properties

ANS: 1  REF: 080924ia  STA: A.G.1  TOP: Compositions of Polygons and Circles

KEY: perimeter

ANS: 3

\[\sqrt{72} = \sqrt{36} \sqrt{2} = 6\sqrt{2}\]

REF: 010920ia  STA: A.N.2  TOP: Simplifying Radicals

ANS: 2  REF: 060923ia  STA: A.A.13  TOP: Addition and Subtraction of Polynomials

KEY: subtraction
\[
\frac{2}{x} - 3 = \frac{26}{x}
\]
\[
-3 = \frac{24}{x}
\]
\[
x = -8
\]

REF: 010918ia  STA: A.A.26  TOP: Solving Rationals

\[
m = \frac{5 - 3}{2 - 7} = \frac{2}{-5}
\]

REF: 010913ia  STA: A.A.33  TOP: Slope

\[
35000(1 - 0.05)^4 \approx 28507.72
\]

REF: fall0719ia  STA: A.A.9  TOP: Exponential Functions

\[
\sqrt{32} = \sqrt{16} \sqrt{2} = 4\sqrt{2}
\]

REF: 060910ia  STA: A.N.2  TOP: Simplifying Radicals

\[
w(w + 5) = 36
\]
\[
w^2 + 5w - 36 = 0
\]

REF: fall0726ia  STA: A.A.5  TOP: Modeling Equations

\[
\frac{4x}{x - 1} - \frac{x^2 - 1}{3x + 3} = \frac{4x}{x - 1} - \frac{(x + 1)(x - 1)}{3(x + 1)} = \frac{4x}{3}
\]

REF: 080826ia  STA: A.A.18  TOP: Multiplication and Division of Rationals

Everyone eats, can shop in malls and wear clothes. People who work in a sporting goods store probably watch more sports television than most.

REF: 010923ia  STA: A.S.3  TOP: Analysis of Data

\[
m = \frac{4 - (-4)}{-5 - 15} = \frac{2}{-5}
\]

REF: 080915ia  STA: A.A.33  TOP: Slope

\[
w^2 + 5w - 36 = 0
\]

REF: fall0726ia  STA: A.A.5  TOP: Modeling Equations

\[
\frac{4x}{x - 1} - \frac{x^2 - 1}{3x + 3} = \frac{4x}{x - 1} - \frac{(x + 1)(x - 1)}{3(x + 1)} = \frac{4x}{3}
\]

REF: 080826ia  STA: A.A.18  TOP: Multiplication and Division of Rationals
\( \begin{align*} x^2 + 5x + 6 &= -x + 1, \quad y = -x + 1 \\
x^2 + 6x + 5 &= 0 \quad \Rightarrow \quad = -(-5) + 1 \\
(x + 5)(x + 1) &= 0 \quad \Rightarrow \quad = 6 \\
x &= -5 \text{ or } -1 \end{align*} \)

REF: 080812ia STA: A.A.11 TOP: Quadratic-Linear Systems

169 ANS: 1

\[
\sin C = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{13}{85}
\]

REF: fall0721ia STA: A.A.42 TOP: Trigonometric Ratios

170 ANS: 2

REF: 010916ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph

171 ANS: 2

The two values are shoe size and height.

REF: fall0714ia STA: A.S.2 TOP: Analysis of Data

172 ANS: 1

REF: 060811ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph

173 ANS: 2

The slope of the inequality is \(-\frac{1}{2}\).

REF: fall0720ia STA: A.G.6 TOP: Linear Inequalities

174 ANS: 3

REF: fall0706ia STA: A.A.19 TOP: Factoring the Difference of Perfect Squares

175 ANS: 2

REF: 080901ia STA: A.A.4 TOP: Modeling Equations

176 ANS: 4

Surveying persons leaving a football game about a sports budget contains the most bias.

REF: 080910ia STA: A.S.3 TOP: Analysis of Data

177 ANS: 2

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 \(\{-1, 0, 2, 3, 4\}\).

REF: 060818ia STA: A.A.30 TOP: Set Theory
\[ \frac{9x^4 - 27x^6}{3x^3} = \frac{9x^4 (1 - 3x^2)}{3x^3} = 3x(1 - 3x^2) \]

REF: fall0718ia  STA: A.A.16  TOP: Rational Expressions
KEY: a > 0

179 ANS: 4  REF: 010927ia  STA: A.N.4  TOP: Operations with Scientific Notation

180 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
Integrated Algebra Multiple Choice Regents Exam Questions

Answer Section

181 ANS: 3  REF: 081117ia  STA: A.A.29  TOP: Set Theory
182 ANS: 2  REF: 061113ia  STA: A.G.5  TOP: Graphing Quadratic Functions
183 ANS: 2

\[ x^2 - x = x + 3 \]  Since \( y = x + 3 \), the solutions are \((3, 6)\) and \((-1, 2)\).

\[ x^2 - 2x - 3 = 0 \]
\[ (x - 3)(x + 1) = 0 \]
\[ x = 3 \text{ or } -1 \]

REF: 061118ia  STA: A.A.11  TOP: Quadratic-Linear Systems

184 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

185 ANS: 4  REF: 061016ia  STA: A.A.2  TOP: Expressions

186 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

187 ANS: 4  REF: 061001ia  STA: A.A.30  TOP: Set Theory
188 ANS: 2  REF: 061115ia  STA: A.S.7  TOP: Scatter Plots
189 ANS: 1  REF: 061021ia  STA: A.A.29  TOP: Set Theory
190 ANS: 3  REF: 061003ia  STA: A.A.13  TOP: Addition and Subtraction of Polynomials

KEY: addition

191 ANS: 1  REF: 061010ia  STA: A.A.40  TOP: Systems of Linear Inequalities
192 ANS: 2  REF: 061128ia  STA: A.A.29  TOP: Set Theory
193 ANS: 2

\[ \left| \frac{55.42 - 50.27}{55.42} \right| \approx 0.093 \]

REF: 081023ia  STA: A.M.3  TOP: Error  KEY: area
194 ANS: 2
\[20000(0.88)^3 = 13629.44\]

REF: 061124ia STA: A.A.9 TOP: Exponential Functions

195 ANS: 1
\[\sin x = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{28}{53}\]

REF: 011109ia STA: A.A.42 TOP: Trigonometric Ratios

196 ANS: 1
REF: 011101ia STA: A.A.31 TOP: Set Theory

197 ANS: 3
REF: 061017ia STA: A.S.11 TOP: Quartiles and Percentiles

198 ANS: 1
REF: 081110ia STA: A.A.1 TOP: Expressions

199 ANS: 3
REF: 011017ia STA: A.G.5 TOP: Graphing Absolute Value Functions

200 ANS: 1
REF: 061114ia STA: A.A.43 TOP: Using Trigonometry to Find an Angle

201 ANS: 2
\[\tan A = \frac{\text{opposite}}{\text{adjacent}} = \frac{14}{48}\]

REF: 061009ia STA: A.A.42 TOP: Trigonometric Ratios

202 ANS: 4
\[s = \frac{d}{t} = \frac{150 \, \text{m}}{1.5 \, \text{min}} \cdot \frac{60 \, \text{min}}{1 \, \text{hr}} = 6000 \, \text{m/hr}\]

REF: 061025ia STA: A.M.1 TOP: Speed

203 ANS: 3
REF: 081103ia STA: A.A.30 TOP: Set Theory

204 ANS: 4
\[A(-3,4) \text{ and } B(5,8). \quad m = \frac{4 - 8}{-3 - 5} = \frac{-4}{-8} = \frac{1}{2}\]

REF: 011007ia STA: A.A.33 TOP: Slope

205 ANS: 1
\[-3(-4)^2(2) + 4(-4) = -96 - 16 = -112\]

REF: 081113ia STA: A.N.6 TOP: Evaluating Expressions

206 ANS: 4
\[\frac{2 + 3 + 0 + 1 + 3 + 2 + 4 + 0 + 2 + 3}{10} = \frac{20}{10} = 2 \quad \frac{x}{10} = 2 + 0.5\]
\[x = 25\]

REF: 081020ia STA: A.S.16 TOP: Average Known with Missing Data

207 ANS: 2
REF: 011002ia STA: A.S.20 TOP: Theoretical Probability
\[ \frac{x}{x+4} - \frac{2x}{x^2-16} = \frac{x}{x+4} \cdot \frac{x^2-16}{2x} = \frac{1}{x+4} \cdot \frac{(x+4)(x-4)}{2} = \frac{x-4}{2} \]

REF: 081130ia STA: A.A.18 TOP: Multiplication and Division of Rationals

ANS: 1

REF: 081102ia STA: A.S.12 TOP: Scatter Plots

\[ \frac{7}{12x} - \frac{y}{6x^2} = \frac{42x^2 - 12xy}{72x^3} = \frac{6x(7x-2y)}{72x^3} = \frac{7x - 2y}{12x^2} \]

REF: 061129ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

ANS: 3

REF: 081001ia STA: A.S.7 TOP: Scatter Plots

\[ \sqrt{5^2 + 7^2} \approx 8.6 \]

REF: 081004ia STA: A.A.45 TOP: Pythagorean Theorem

ANS: 2

REF: 081004ia STA: A.A.45 TOP: Pythagorean Theorem

\[ x = \frac{-b}{2a} = \frac{-6}{2(-1)} = 3. \]

REF: 011177ia STA: A.A.41 TOP: Identifying the Vertex of a Quadratic Given Equation

ANS: 1

\[ 15000(1.2)^3 = 21,600, \ 21,600 - 15,000 = 6,600 \]

REF: 061030ia STA: A.A.9 TOP: Exponential Functions

ANS: 2

Candidate B received 45%. 45% \times 1860 = 837

REF: 081007ia STA: A.N.5 TOP: Percents

ANS: 2

\[ m = \frac{5 - 3}{8 - 1} = \frac{2}{7}, \ y - y_i = m(x - x_i) \]

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

REF: 081029ia STA: A.A.35 TOP: Writing Linear Equations

ANS: 3

\[ 2(1) + 3 = 5 \]

REF: 061007ia STA: A.A.39 TOP: Linear Equations
\[ A = lw + \frac{\pi r^2}{2} = 6 \cdot 5 + \frac{\pi \cdot 3^2}{2} \approx 44.1 \]

REF: 061029ia STA: A.G.1 TOP: Compositions of Polygons and Circles
KEY: area

\[ 3\sqrt{2} + \sqrt{8} = 3\sqrt{2} + \sqrt{4 \cdot \sqrt{2}} = 3\sqrt{2} + 2\sqrt{2} = 5\sqrt{2} \]

REF: 011121ia STA: A.N.3 TOP: Operations with Radicals
KEY: addition

\[ \frac{x + 2}{x - 2} = \frac{-3}{x} \]
\[ x(x + 2) = -3(x - 2) \]
\[ x^2 + 2x = -3x + 6 \]
\[ x^2 + 5x - 6 = 0 \]
\[ (x + 6)(x - 1) = 0 \]
\[ x = -6 \text{ or } 1 \]

REF: 011028ia STA: A.A.26 TOP: Solving Rationals

\[ 36x^2 - 100y^6 = 4(9x^2 - 25y^6) = 4(3x + 5y^3)(3x - 5y^3) \]

REF: 081129ia STA: A.A.19 TOP: Factoring the Difference of Perfect Squares

\[ l(l - 3) = 40 \]
\[ l^2 - 3l - 40 = 0 \]
\[ (l - 8)(l + 5) = 0 \]
\[ l = 8 \]

REF: 081116ia STA: A.A.8 TOP: Geometric Applications of Quadratics

\[ 5 \times 2 \times 3 = 30 \]

REF: 061002ia STA: A.N.7 TOP: Multiplication Counting Principle
227 ANS: 1

\[ 7 + 8 + 7 + \frac{12\pi}{2} = 22 + 6\pi \]

REF: 081128ia STA: A.G.1 TOP: Compositions of Polygons and Circles
KEY: perimeter

228 ANS: 4

In (4), each element in the domain corresponds to a unique element in the range.

REF: 011018ia STA: A.G.3 TOP: Defining Functions

229 ANS: 2

REF: 081106ia STA: A.S.6 TOP: Box-and-Whisker Plots

230 ANS: 4

REF: 081107ia STA: A.A.5 TOP: Modeling Inequalities

231 ANS: 2

REF: 061105ia STA: A.A.20 TOP: Factoring Polynomials

232 ANS: 3

REF: 061119ia STA: A.A.2 TOP: Expressions

233 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

234 ANS: 3

\[ x^2 - 9 = 0 \]

\[ (x + 3)(x - 3) = 0 \]

\[ x = \pm 3 \]

REF: 061014ia STA: A.A.15 TOP: Undefined Rationals

235 ANS: 3

The age of a child does not cause the number of siblings he has, or vice versa.

REF: 011030ia STA: A.S.14 TOP: Analysis of Data

236 ANS: 4

REF: 081022ia STA: A.A.29 TOP: Set Theory

237 ANS: 2

\[ m = \frac{5 - 2}{3 - (-2)} = \frac{3}{5} \]

REF: 061004ia STA: A.A.33 TOP: Slope

238 ANS: 3

REF: 081017a STA: A.S.14 TOP: Analysis of Data

239 ANS: 2

\[ \sqrt{18.4^2 - 7^2} \approx 17 \]

REF: 011107ia STA: A.A.45 TOP: Pythagorean Theorem

240 ANS: 4

REF: 061130ia STA: A.A.13 TOP: Addition and Subtraction of Polynomials
KEY: subtraction
### TOP: Identifying the Vertex of a Quadratic Given Graph

ANS: 2

- **REF:** 011015ia
- **STA:** A.G.10

**TOP:** Analysis of Data

ANS: 2

- **REF:** 061122ia
- **STA:** A.S.14

2y - 2x = 10

- **axis of symmetry:** \( x = \frac{-b}{2a} = \frac{-2}{2(1)} = -1 \)

2y = 2x + 10

\( y = x + 5 \)

**REF:** 081010ia
- **STA:** A.G.9
- **TOP:** Quadratic-Linear Systems

ANS: 4

- **REF:** 061022ia
- **STA:** A.S.3

**TOP:** Factoring Polynomials

ANS: 2

- **REF:** 061027ia
- **STA:** A.A.20

**TOP:** Transforming Formulas

ANS: 4

\[ SA = 2lw + 2hw + 2lh = 2(2)(3) + 2(4)(3) + 2(2)(4) = 52 \]

**REF:** 011029ia
- **STA:** A.G.2

**TOP:** Surface Area

ANS: 2

- **REF:** 061023ia
- **STA:** A.A.23

**TOP:** Writing Linear Equations

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

ANS: 2

- **REF:** 011019ia
- **STA:** A.S.12

**TOP:** Parallel and Perpendicular Lines

ANS: 1

\( y = mx + b \)

\( 5 = (-2)(1) + b \)

\( b = 7 \)

**REF:** 081108ia
- **STA:** A.A.34

**TOP:** Solving Linear Systems

ANS: 3

\( 2x - 5y = 11 \)

\( -2x + 3y = -9 \)

\( -2y = 2 \)

\( x = 3 \)

\( y = -1 \)

**REF:** 081109ia
- **STA:** A.A.10

**TOP:** Solving Linear Systems
\[
\frac{2x - 3}{x - 4} = \frac{2}{3}
\]

\[
3(2x - 3) = 2(x - 4)
\]

\[
6x - 9 = 2x - 8
\]

\[
4x = 1
\]

\[
x = \frac{1}{4}
\]

In (2), each element in the domain corresponds to a unique element in the range.

\[
\frac{1}{4}
\]

254 ANS: 2
REF: 081012ia STA: A.A.26 TOP: Solving Rationals

255 ANS: 4
REF: 081003ia STA: A.A.31 TOP: Set Theory

256 ANS: 2
REF: 061116ia STA: A.G.3 TOP: Defining Functions

257 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

258 ANS: 1
The slope of \(2x - 4y = 16\) is \(\frac{-A}{B} = \frac{-2}{-4} = \frac{1}{2}\)

REF: 011026ia STA: A.A.38 TOP: Parallel and Perpendicular Lines

259 ANS: 4
REF: 011020ia STA: A.A.12 TOP: Multiplication of Powers

260 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

261 ANS: 2
REF: 081111ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph
262 ANS: 2
\[
\tan B = \frac{\text{opposite}}{\text{adjacent}} = \frac{8}{15} = 0.53
\]

REF: 081026ia STA: A.A.42 TOP: Trigonometric Ratios

263 ANS: 4
REF: 081025ia STA: A.G.4 TOP: Families of Functions

264 ANS: 4
\[
6\sqrt{50} + 6\sqrt{2} = 6\sqrt{25 \cdot \sqrt{2} + 6\sqrt{2}} = 30\sqrt{2} + 6\sqrt{2} = 36\sqrt{2}
\]

REF: 011024ia STA: A.N.3 TOP: Operations with Radicals

265 ANS: 3
\[
\frac{12x^2 - 6x^2 + 2x}{2x} = \frac{2x(6x^2 - 3x + 1)}{2x} = 6x^2 - 3x + 1
\]

REF: 011024ia STA: A.A.14 TOP: Division of Polynomials

266 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

267 ANS: 4
The other situations are quantitative.

REF: 081122ia STA: A.S.1 TOP: Analysis of Data

268 ANS: 2
\[
\left| \frac{13.5 - 12.8}{13.5} \right| \approx 0.093
\]

REF: 081123ia STA: A.M.3 TOP: Error KEY: area

269 ANS: 4
REF: 011116ia STA: A.S.1 TOP: Analysis of Data

270 ANS: 1
REF: 081115ia STA: A.A.32 TOP: Slope

271 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

272 ANS: 3
\[
75 - 15 = 60
\]

REF: 011113ia STA: A.S.6 TOP: Box-and-Whisker Plots
273 ANS: 2
\[ J - M = 3 \]
\[ 8J + 8M = 120 \]
\[ 8J - 8M = 24 \]
\[ 16J = 144 \]
\[ J = 9 \]

REF: 011115ia STA: A.A.7 TOP: Writing Linear Systems

274 ANS: 2
\[ y - kx = 7 \] may be rewritten as \[ y = kx + 7 \]

REF: 061015ia STA: A.A.38 TOP: Parallel and Perpendicular Lines

275 ANS: 4
REF: 061111ia STA: A.G.4 TOP: Families of Functions

276 ANS: 1
REF: 061024ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

277 ANS: 3
\[ \sqrt{72} - 3\sqrt{2} = \sqrt{36 \cdot 2} - 3\sqrt{2} = 6\sqrt{2} - 3\sqrt{2} = 3\sqrt{2} \]

REF: 061008ia STA: A.N.3 TOP: Operations with Radicals
KEY: subtraction

278 ANS: 1
\[ \frac{x^2 - x - 6}{x^2 - 5x + 6} = \frac{(x - 3)(x + 2)}{(x - 3)(x + 2)} = \frac{x + 2}{x - 2} \]

REF: 011130ia STA: A.A.16 TOP: Rational Expressions
KEY: a > 0

279 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

280 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
281 ANS: 2
\[2(x - 3y = -3)\]
\[2x + y = 8\]
\[2x - 6y = -6\]
\[7y = 14\]
\[y = 2\]

REF: 081021ia STA: A.A.10 TOP: Solving Linear Systems

282 ANS: 2
\[\sin 57 = \frac{x}{8}\]
\[x \approx 6.7\]

REF: 061108ia STA: A.A.44 TOP: Using Trigonometry to Find a Side

283 ANS: 3
\[3\sqrt{250} = 3\sqrt{25\sqrt{10}} = 15\sqrt{10}\]

REF: 061106ia STA: A.N.2 TOP: Simplifying Radicals

284 ANS: 2
REF: 011023ia STA: A.A.40 TOP: Systems of Linear Inequalities

285 ANS: 1
\[\frac{2x}{3} + \frac{1}{2} = \frac{5}{6}\]
\[2x \times \frac{1}{3} \times \frac{1}{3} = \frac{3}{3}\]
\[6x = 3\]
\[x = \frac{1}{2}\]

REF: 011112ia STA: A.A.25 TOP: Solving Equations with Fractional Expressions

286 ANS: 3
REF: 011103ia STA: A.S.12 TOP: Scatter Plots

287 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

288 ANS: 1
REF: 061005ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph
\[ \tan ABC = \frac{\text{opposite}}{\text{adjacent}} = \frac{5}{12} \]

REF: 081112ia STA: A.A.42 TOP: Trigonometric Ratios

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

ANS: 2

\[ f + m = 53 \]
\[ f - m = 25 \]
\[ 2m = 28 \]
\[ m = 14 \]

REF: 061126ia STA: A.A.7 TOP: Writing Linear Systems

ANS: 3

\[ \left(10w^3\right)^2 = \frac{100w^6}{5w} = 20w^5 \]

REF: 011124ia STA: A.A.12 TOP: Powers of Powers

ANS: 3

\[ \frac{3}{2x} + \frac{7}{4x} = \frac{12x + 14x}{8x^2} = \frac{26x}{8x^2} = \frac{13}{4x} \]

REF: 011120ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

ANS: 2

\[ \frac{15}{15 + 13 + 12} = \frac{15}{40} = \frac{3}{8} \]

REF: 061006ia STA: A.S.21 TOP: Experimental Probability

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

ANS: 3

REF: 011117ia STA: A.G.4 TOP: Graphing Absolute Value Functions
ANS: 1
\[ b = 2j + 4 \quad 2j + 4 = 31 - j \]
\[ b + j = 31 \quad 3j = 27 \]
\[ b = 31 - j \quad j = 9 \]

REF: 081119ia STA: A.A.7 TOP: Writing Linear Systems

ANS: 1 REF: 011004ia STA: A.A.31 TOP: Set Theory

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

ANS: 2
\[ 2000(1 + 0.04)^3 \approx 2249 \]

REF: 081124ia STA: A.A.9 TOP: Exponential Functions

ANS: 4 REF: 061123ia STA: A.A.31 TOP: Set Theory

ANS: 2 REF: 081104ia STA: A.S.14 TOP: Analysis of Data

ANS: 4
\[ 9.2 \times 10^6 \]
\[ \frac{2.3 \times 10^2}{4 \times 10^4} = 4 \times 10^4 \]

REF: 081006ia STA: A.N.4 TOP: Operations with Scientific Notation

ANS: 2
Debbie failed to distribute the 3 properly.

REF: 011009ia STA: A.A.22 TOP: Solving Equations

ANS: 2
\[ a^3 - 4a = a(a^2 - 4) = a(a - 2)(a + 2) \]

REF: 011108ia STA: A.A.19 TOP: Factoring the Difference of Perfect Squares

ANS: 2 REF: 011012ia STA: A.G.9 TOP: Quadratic-Linear Systems

ANS: 4
\[ P_3 = 336 \]

REF: 061026ia STA: A.N.8 TOP: Permutations

ANS: 1 REF: 011001ia STA: A.S.6 TOP: Box-and-Whisker Plots

ANS: 4 REF: 061018ia STA: A.A.12 TOP: Division of Powers

ANS: 4 REF: 011016ia STA: A.A.23 TOP: Transforming Formulas

ANS: 2
\[ m = -\frac{A}{B} = -\frac{3}{-7} = \frac{3}{7} \]

REF: 011122ia STA: A.A.37 TOP: Slope

ANS: 3 REF: 081009ia STA: A.A.30 TOP: Set Theory
316 ANS: 3
\[ m = \frac{6 - 4}{3 - (-2)} = \frac{2}{5} \]

REF: 061110ia STA: A.A.33 TOP: Slope

317 ANS: 4
REF: 011114ia STA: A.N.1 TOP: Properties of Reals

318 ANS: 3
mean = 81 \frac{7}{11}, \text{median} = 81 \text{ and mode} = 76

REF: 011118ia STA: A.S.4 TOP: Central Tendency

319 ANS: 1
\[ \frac{12.8 + 17.2}{3 + 5} = 3.75 \]

REF: 061117ia STA: A.M.1 TOP: Speed

320 ANS: 2
\[ x^2 - 2x - 15 = 0 \]
\[ (x - 5)(x + 3) = 0 \]
\[ x = 5, x = -3 \]

REF: 011128ia STA: A.A.28 TOP: Roots of Quadratics

321 ANS: 1
REF: 061103ia STA: A.A.12 TOP: Division of Powers

322 ANS: 2
REF: 061127ia STA: A.N.4 TOP: Operations with Scientific Notation

323 ANS: 3
Frequency is not a variable.

REF: 011014ia STA: A.S.2 TOP: Analysis of Data

324 ANS: 1
REF: 081015ia STA: A.G.5 TOP: Graphing Quadratic Functions

325 ANS: 2
\[ x^2 - 5x + 6 = 0 \]
\[ (x - 3)(x - 2) = 0 \]
\[ x = 3, x = 2 \]

REF: 081120ia STA: A.A.28 TOP: Roots of Quadratics

326 ANS: 3
REF: 081118ia STA: A.G.4 TOP: Families of Functions

327 ANS: 2
REF: 011110ia STA: A.N.6 TOP: Evaluating Expressions
328  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

329  ANS: 3  REF: 061101ia  STA: A.A.19
TOP: Factoring the Difference of Perfect Squares

330  ANS: 1  REF: 011126ia  STA: A.A.13  TOP: Addition and Subtraction of Polynomials
KEY: subtraction

331  ANS: 1
Asking school district employees about a school board candidate produces the most bias.

REF: 061107ia  STA: A.S.3  TOP: Analysis of Data

332  ANS: 4
\( \sqrt{P} = 5 \times 4 \times 3 \times 2 \times 1 = 120 \)

REF: 061109ia  STA: A.N.8  TOP: Permutations

333  ANS: 1  REF: 081030ia  STA: A.A.3  TOP: Expressions

334  ANS: 4  REF: 061028ia  STA: A.G.6  TOP: Linear Inequalities

335  ANS: 2  REF: 011119ia  STA: A.A.29  TOP: Set Theory

336  ANS: 3
\[ m = \frac{7 - 3}{-3 - 3} = \frac{4}{-6} = -\frac{2}{3} \quad y = mx + b \]
\[ 3 = -\frac{2}{3} (3) + b \]
\[ 3 = -2 + b \]
\[ 5 = b \]

REF: 011013ia  STA: A.A.35  TOP: Writing Linear Equations

337  ANS: 2  REF: 011022ia  STA: A.A.19
TOP: Factoring the Difference of Perfect Squares

338  ANS: 2
\[ A = lw + lw + \frac{\pi r^2}{4} = 5 \cdot 3 + 5 \cdot 3 + \frac{\pi \cdot 3^2}{4} \approx 37 \]

REF: 011123ia  STA: A.G.1  TOP: Compositions of Polygons and Circles
KEY: area
339  ANS: 3
\[ \cos A = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{15}{17} \]

REF: 011008ia  STA: A.A.42  TOP: Trigonometric Ratios

340  ANS: 4
\[ 5(x + 4) = 5x + 20 \]

REF: 081013ia  STA: A.A.1  TOP: Expressions

341  ANS: 3
\[ \frac{3 + 2 + 4 + 3}{20} = \frac{12}{20} \]

REF: 011129ia  STA: A.S.21  TOP: Experimental Probability

342  ANS: 3  REF: 081008ia  STA: A.A.19  TOP: Factoring the Difference of Perfect Squares

343  ANS: 2
\[ R = 0.5^{d-1} \]

REF: 011006ia  STA: A.A.9  TOP: Exponential Functions

344  ANS: 4
\[-6x - 17 \geq 8x + 25 \]
\[-42 \geq 14x \]
\[-3 \geq x \]

REF: 081121ia  STA: A.A.24  TOP: Solving Inequalities

345  ANS: 3
\[ P(S) \cdot P(M) = P(S \text{ and } M) \]
\[ \frac{3}{5} \cdot P(M) = \frac{3}{10} \]
\[ P(M) = \frac{1}{2} \]

REF: 081024ia  STA: A.S.23  TOP: Theoretical Probability
KEY: independent events

346  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
347 ANS: 3

\[ P_4 = 360 \]

REF: 081028ia STA: A.N.8 TOP: Permutations

348 ANS: 1

\[- |a - b| = -|7 - (-3)| = -|-10| = -10 \]

REF: 011010ia STA: A.N.6 TOP: Evaluating Expressions

349 ANS: 3

\[ 10^2 + 10^2 = c^2 \]
\[ c^2 = 200 \]
\[ c \approx 14.1 \]

REF: 061102ia STA: A.A.45 TOP: Pythagorean Theorem

350 ANS: 4

\[-3x(x - 4) - 2x(x + 3) = -3x^2 + 12x - 2x^2 - 6x = -5x^2 + 6x \]

REF: 081114ia STA: A.A.13 TOP: Addition and Subtraction of Monomials

351 ANS: 1

\[ 1P + 2C = 5 \]
\[ 1P + 4C = 6 \]
\[ 2C = 1 \]
\[ C = 0.5 \]

REF: 011003ia STA: A.A.7 TOP: Writing Linear Systems

352 ANS: 4

\[ \frac{150}{20} = \frac{x}{30} \]
\[ 20x = 4500 \]
\[ x = 225 \]

REF: 0811101ia STA: A.N.5 TOP: Direct Variation

353 ANS: 4 REF: 011102ia STA: A.G.9 TOP: Quadratic-Linear Systems

354 ANS: 4

In (4), each element in the domain corresponds to a unique element in the range.

REF: 011105ia STA: A.G.3 TOP: Defining Functions

355 ANS: 4 REF: 011111ia STA: A.G.8 TOP: Solving Quadratics by Graphing

356 ANS: 3

\[ P(O) = \frac{5}{10}, P(P) = \frac{4}{10}, P(\leq 5) = \frac{6}{10}, P(3) = \frac{4}{10} \]

REF: 081125ia STA: A.S.22 TOP: Theoretical Probability
\[ \frac{ev}{n} + k = t \]
\[ \frac{ev}{n} = t - k \]
\[ y = \frac{n(t - k)}{e} \]
Integrated Algebra 2 Point Regents Exam Questions
Answer Section

361 ANS:
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.

PTS: 2  
REF: fall0733ia  
STA: A.G.1  
TOP: Compositions of Polygons and Circles

KEY: perimeter

362 ANS: 
\[d = 6.25h, \quad 250. \quad d = 6.25(40) = 250\]

PTS: 2  
REF: 010933ia  
STA: A.N.5  
TOP: Direct Variation

363 ANS: 
\[3a^2b^2 - 6a = \frac{45a^4b^3 - 90a^3b}{15a^2b} = \frac{45a^4b^3}{15a^2b} - \frac{90a^3b}{15a^2b} = 3a^2b^2 - 6a\]

PTS: 2  
REF: 081031ia  
STA: A.A.14  
TOP: Division of Polynomials

364 ANS: 
\[4. \quad 3 + 2g = 5g - 9\]
\[12 = 3g\]
\[g = 4\]

PTS: 2  
REF: fall0732ia  
STA: A.A.22  
TOP: Solving Equations

365 ANS: 
\[\frac{600 - 592}{592} \approx 0.014\]

PTS: 2  
REF: 061031ia  
STA: A.M.3  
TOP: Error

KEY: volume and surface area

366 ANS: 
\[111.25. \quad \frac{\text{distance}}{\text{time}} = \frac{89}{0.8} = 111.25\]

PTS: 2  
REF: 080831ia  
STA: A.M.1  
TOP: Speed

367 ANS: 
Ann’s. \[\frac{225}{15} = 15\text{ mpg} \text{ is greater than} \quad \frac{290}{23.2} = 12.5\text{ mpg}\]

PTS: 2  
REF: 060831ia  
STA: A.M.1  
TOP: Using Rate
368  ANS:  
\{1,2,4,5,9,10,12\}  
PTS: 2  REF: 080833ia  STA: A.A.30  TOP: Set Theory  

369  ANS:  
36 − 9\pi.  15.6. 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  
KEY: area  

370  ANS:  
\(x = 1; (1, -5)\)  
PTS: 2  REF: 061133ia  STA: A.G.10  TOP: Identifying the Vertex of a Quadratic Given Graph  

371  ANS:  
\(\frac{3k^2 m^6}{4}\)  
PTS: 2  REF: 010932ia  STA: A.A.12  TOP: Division of Powers  

372  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  

373  ANS:  
(1) Distributive; (2) Commutative  
PTS: 2  REF: 061132ia  STA: A.N.1  TOP: Identifying Properties  

374  ANS:  
\(bc + ac = ab\)  
\(c(b + a) = ab\)  
\(c = \frac{ab}{b + a}\)  
PTS: 2  REF: 081131ia  STA: A.A.23  TOP: Transforming Formulas  

375  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
376  ANS:  
\[-3\sqrt{48} = -3\sqrt{16\cdot 3} = -12\sqrt{3}\]

PTS:  2   REF:  081033ia   STA:  A.N.2   TOP:  Simplifying Radicals

377  ANS:  
\[2,160 \cdot \frac{1,200}{25} = \frac{x}{45}\]
\[25x = 54,000\]
\[x = 2,160\]

PTS:  2   REF:  081032ia   STA:  A.M.1   TOP:  Using Rate

378  ANS:  
\[4x(x + 3)(x - 3). \quad 4x^2 - 36x = 4x(x^2 - 9) = 4x(x + 3)(x - 3)\]

PTS:  2   REF:  060932ia   STA:  A.A.19   TOP:  Factoring the Difference of Perfect Squares

379  ANS:  
53. \(\sin A = \frac{16}{20}\)
\[A \approx 53\]

PTS:  2   REF:  011032ia   STA:  A.A.43   TOP:  Using Trigonometry to Find an Angle

380  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

381  ANS:  
\[\frac{x^2 - 5x - 24}{x - 8} = \frac{(x - 8)(x + 3)}{x - 8} = x + 3\]

PTS:  2   REF:  061131ia   STA:  A.A.14   TOP:  Division of Polynomials

382  ANS:  
\[30\sqrt{2}. \quad 5\sqrt{72} = 5\sqrt{36\cdot 2} = 30\sqrt{2}\]

PTS:  2   REF:  fall0731ia   STA:  A.N.2   TOP:  Simplifying Radicals

383  ANS:  
60. \(\binom{5}{3} = 60\)

PTS:  2   REF:  060931ia   STA:  A.N.8   TOP:  Permutations

384  ANS:  
\[0 \leq t \leq 40\]

PTS:  2   REF:  060833ia   STA:  A.A.31   TOP:  Set Theory
385 ANS:
50. \(12 + 10 + 12 + \frac{1}{2}(10\pi) \approx 50\)

PTS: 2 REF: 010931ia STA: A.G.1 TOP: Compositions of Polygons and Circles
KEY: perimeter

386 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

387 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

388 ANS:
\[\begin{align*}
2.1. \quad \cos 65 &= \frac{x}{5} \\
\end{align*}\]
\(x \approx 2.1\)

PTS: 2 REF: 011133ia STA: A.A.44 TOP: Using Trigonometry to Find a Side

389 ANS:
orchestra: \(\frac{3}{26} > \frac{4}{36}\)

PTS: 2 REF: 011033ia STA: A.S.22 TOP: Theoretical Probability

390 ANS:

\[\begin{array}{|c|c|c|c|}
\hline
\text{Scores} & \text{Frequency} \\
\hline
10-15 & 5 \\
15-20 & 1 \\
20-25 & 3 \\
25-30 & 1 \\
\hline
\end{array}\]

PTS: 2 REF: 081132ia STA: A.S.5 TOP: Frequency Histograms, Bar Graphs and Tables
KEY: frequency histograms

391 ANS:
5,112. \((12 \times 30 \times 16) - (6 \times 12 \times 9) = 5112\)

PTS: 2 REF: 080932ia STA: A.G.2 TOP: Volume
\[
\frac{3}{8} \times P(s_1 < 4) \times P(s_2 = \text{back}) = \frac{3}{4} \times \frac{1}{2} = \frac{3}{8}
\]

393 ANS:
16. 12 feet equals 4 yards. \(4 \times 4 = 16\).

394 ANS:
5. \(48\) inches \times \(\frac{1\text{ yard}}{36\text{ inches}} = \frac{4}{3}\) yards \times $3.75 = $5.00

395 ANS:
\(-6a + 42\). distributive

396 ANS:
\[
\frac{1375}{1600} \times \frac{40^2 - 15^2}{40^2} = \frac{1375}{1600}
\]

PTS: 2  REF: 080832ia  STA: A.S.23  TOP: Geometric Probability

PTS: 2  REF: 011031ia  STA: A.M.2  TOP: Conversions

PTS: 2  REF: 011131ia  STA: A.M.2  TOP: Conversions

PTS: 2  REF: 011132ia  STA: A.M.2  TOP: Conversions

PTS: 2  REF: 061032ia  STA: A.N.1  TOP: Properties of Reals

PTS: 2  REF: 011132ia  STA: A.S.20  TOP: Geometric Probability
Integrated Algebra 3 Point Regents Exam Questions
Answer Section

397 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

398 ANS:
minimum is 120, 1st quartile is 145, median is 292, 3rd quartile is 407, and maximum is 452

PTS: 3 REF: 081034ia STA: A.S.5 TOP: Box-and-Whisker Plots

399 ANS:
7. \(15x + 22 \geq 120\)
\[ x \geq 6.53 \]

PTS: 3 REF: fall0735ia STA: A.A.6 TOP: Modeling Inequalities

400 ANS:
-12. \(3 \left[ \frac{2}{3} x + 3 < -2x - 7 \right] \)
\[ x + 9 < -6x - 21 \]
\[ 7x < -30 \]
\[ x < \frac{-30}{7} \]

PTS: 3 REF: 061034ia STA: A.A.21 TOP: Interpreting Solutions

401 ANS:
\( \frac{38}{\pi} \), 2. \( V = \pi r^2 h \).
\[ \frac{36}{\pi} \approx 2.97 \]. Three cans will not fit. The maximum number is 2.

\[ 342 = \pi \left( \frac{6}{2} \right)^2 h \]
\[ 342 = h \]
\[ \frac{38}{\pi} = h \]

PTS: 3 REF: 010936ia STA: A.G.2 TOP: Volume
402 ANS:
\[ 60 - 42\sqrt{5} \] 3\sqrt{20}(2\sqrt{5} - 7) = 6\sqrt{100} - 21\sqrt{20} = 60 - 21\sqrt{4\sqrt{5}} = 60 - 42\sqrt{5} \]

PTS: 3  REF: 080834ia  STA: A.N.3  TOP: Operations with Radicals
KEY: multiplication

403 ANS:
10 + 2d \geq 75, 33. 10 + 2d \geq 75
\[ d \geq 32.5 \]

PTS: 3  REF: 060834ia  STA: A.A.6  TOP: Modeling Inequalities

404 ANS:
\[ y = \frac{2}{5}x + 2. \]
\[ m = \frac{4 - 0}{5 - (-5)} = \frac{2}{5} \]
\[ y = mx + b \]
\[ 4 = \frac{2}{5}(5) + b \]
\[ b = 2 \]

PTS: 3  REF: 080836ia  STA: A.A.35  TOP: Writing Linear Equations

405 ANS:
They will not reach their goal in 18 months.

PTS: 3  REF: 061036ia  STA: A.S.17  TOP: Scatter Plots

406 ANS:
\[ x = \frac{-b}{2a} = \frac{-(-8)}{2(-2)} = -2 \]
\[ (-2, 11). \]
\[ y = -2(-2)^2 - 8(-2) + 3 = 11 \]

PTS: 3  REF: 080934ia  STA: A.A.41  TOP: Identifying the Vertex of a Quadratic Given Equation
56. If the circumference of circle $O$ is 16$\pi$ 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 $\frac{1}{2} \times 4(12 + 16) = 56$.

**ANS:**

$$\text{area}$$

**PTS:** 3  
**REF:** 060934ia  
**STA:** A.G.1  
**TOP:** Compositions of Polygons and Circles  
**KEY:** area

408 ANS:

$$\frac{1}{6}, \ 16.67\%, \$13.50. \ \frac{18 - 15}{18} = \frac{1}{6}, \ 18 \times 0.75 = 13.5$$

**PTS:** 3  
**REF:** 060835ia  
**STA:** A.N.5  
**TOP:** Percents

409 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

410 ANS:

$$\frac{3}{4x - 8} \cdot \frac{3x + 6}{4x + 12} \cdot \frac{x^2 - 4}{x + 3} = \frac{3(x + 2)}{4(x + 3)} \cdot \frac{x + 3}{(x + 2)(x - 2)} = \frac{3}{4(x - 2)}$$

**PTS:** 3  
**REF:** 010935ia  
**STA:** A.A.18  
**TOP:** Multiplication and Division of Rationals

411 ANS:

$$0.65x + 35 \leq 45$$

$$0.65x \leq 10$$

$$x \leq 15$$

**PTS:** 3  
**REF:** 061135ia  
**STA:** A.A.6  
**TOP:** Modeling Inequalities
ANS:

The graph becomes steeper.

412 ANS:

\[ y = \begin{cases} 3|x| & \\ 4|x| & \end{cases} \]

The graph becomes steeper.

413 ANS:

\[-15, 2 \]

\[ x^2 + 13x - 30 = 0 \]

\[ (x + 15)(x - 2) = 0 \]

\[ x = -15, 2 \]

414 ANS:

80, 136

\[ V = lwh = 10 \cdot 2 \cdot 4 = 80 \]

\[ SA = 2lw + 2lh + 2hl = 2 \cdot 10 \cdot 2 + 2 \cdot 4 \cdot 2 + 2 \cdot 10 \cdot 4 = 136 \]

415 ANS:

5, 583.86

\[ A = P(1 + R)^t = 5000(1 + 0.0375)^3 \approx 5583.86 \]

416 ANS:

50, 1.5, 10

\[ \frac{\text{distance}}{\text{time}} = \frac{60}{1.2} = 50. \]

\[ \frac{\text{distance}}{\text{time}} = \frac{60}{40} = 1.5. \]

\[ \text{speed} \times \text{time} = 55 \times 2 = 110. \]

\[ 120 - 110 = 10 \]

417 ANS:

\[-2\sqrt{3} \]

\[ \frac{16\sqrt{21}}{2\sqrt{7}} - 5\sqrt{12} = 8\sqrt{3} - 5\sqrt{4 \cdot 3} = 8\sqrt{3} - 10\sqrt{3} = -2\sqrt{3} \]

418 ANS:

12, 7. Both the median and the mode will increase.

12, 7. Both the median and the mode will increase.
419 ANS:

![Graph showing points (4,0) and (6,0)]

PTS: 3 REF: 060836ia STA: A.G.8 TOP: Solving Quadratics by Graphing

420 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

421 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

422 ANS:

\[1,512, 1,551.25, 0.025.\quad 36 \times 42 = 1512.\quad 36.5 \times 42.5 = 1551.25.\quad RE = \left| \frac{1512 - 1551.25}{1551.25} \right| \approx 0.025.\]

PTS: 3 KEY: area REF: 010934ia STA: A.M.3 TOP: Error

423 ANS:

\[81.3, 80, \text{ both increase}\]

PTS: 3 REF: 011035ia STA: A.S.16 TOP: Central Tendency
424 ANS:
\[ y = \frac{3}{4}x + 10 \quad y = mx + b \]

\[ 4 = \frac{3}{4}(-8) + b \]

\[ 4 = -6 + b \]

\[ 10 = b \]

PTS: 3  REF: 011134ia  STA: A.A.34  TOP: Writing Linear Equations

425 ANS:
Greg’s rate of 5.5 is faster than Dave’s rate of 5.3.

\[ \frac{\text{distance}}{\text{time}} = \frac{11}{2} = 5.5 \quad \frac{16}{3} = 5.3 \]

PTS: 3  REF: 080936ia  STA: A.M.1  TOP: Speed

426 ANS:

![Graph](image)

PTS: 3  REF: 060936ia  STA: A.S.8  TOP: Scatter Plots

427 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

428 ANS:

41.8. \[ \sin x = \frac{8}{12} \]

\[ A \approx 41.8 \]

PTS: 3  REF: 081135ia  STA: A.A.43  TOP: Using Trigonometry to Find an Angle

429 ANS:

![Graph](image)

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
430 ANS:

30.4%; no, 23.3%. \[
\frac{7.50 - 5.75}{5.75} = 30.4\%.
\]

\[
\frac{7.50 - 5.75}{7.50} = 23.3\%
\]

PTS: 3 REF: 080935ia STA: A.N.5 TOP: Percents

431 ANS:

\[
\text{Data Table:}
\begin{array}{|c|c|c|}
\hline
\text{Interval} & \text{Tally} & \text{Frequency} \\
\hline
51-60 & II & 2 \\
61-70 & II & 2 \\
71-80 & IIII & 4 \\
81-90 & IIIII & 6 \\
91-100 & IIIIIII & 4 \\
\hline
\end{array}
\]

PTS: 3 REF: 011135ia STA: A.S.5 TOP: Frequency Histograms, Bar Graphs and Tables KEY: frequency histograms

432 ANS:

Graph becomes wider as the coefficient approaches 0.

PTS: 3 REF: 061035ia STA: A.G.5 TOP: Graphing Absolute Value Functions
Integrated Algebra 4 Point Regents Exam Questions
Answer Section

433 ANS:

PTS: 4  REF: 060938ia  STA: A.S.5  TOP: Frequency Histograms, Bar Graphs and Tables  KEY: frequency histograms

434 ANS:

PTS: 4  REF: 081138ia  STA: A.G.9  TOP: Quadratic-Linear Systems

435 ANS:

PTS: 4  REF: 080939ia  STA: A.S.5  TOP: Box-and-Whisker Plots

436 ANS:

\[
0.029. \quad \frac{[2\pi(5.1)^2 + 2\pi(5.1)(15.1)] - [2\pi(5)^2 + 2\pi(5)(15)]}{2\pi(5.1)^2 + 2\pi(5.1)(15.1)} \approx \frac{647.294 - 628.319}{647.294} \approx 0.029
\]

PTS: 4  REF: 011137ia  STA: A.M.3  TOP: Error  KEY: volume and surface area
437 ANS:

\[ \sin 50 = \frac{x}{110} \quad \cos 50 = \frac{y}{110} \]

\[ x \approx 84 \quad y \approx 71 \]

PTS: 4 \hspace{0.5cm} \text{REF: 081039ia} \hspace{0.5cm} \text{STA: A.A.44} \hspace{0.5cm} \text{TOP: Using Trigonometry to Find a Side}

438 ANS:

\((-2, 5)\).  \[3x + 2y = 4 \quad 12x + 8y = 16 \]
\[4x + 3y = 7 \quad 12x + 9y = 21 \]

\[3x + 2(5) = 4 \quad 3x = -6 \]

\[y = 5 \quad x = -2\]

PTS: 4 \hspace{0.5cm} \text{REF: 010937ia} \hspace{0.5cm} \text{STA: A.A.10} \hspace{0.5cm} \text{TOP: Solving Linear Systems}

439 ANS:

PTS: 4 \hspace{0.5cm} \text{REF: fall0738ia} \hspace{0.5cm} \text{STA: A.G.9} \hspace{0.5cm} \text{TOP: Quadratic-Linear Systems}

440 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 \hspace{0.5cm} \text{REF: fall0739ia} \hspace{0.5cm} \text{STA: A.A.26} \hspace{0.5cm} \text{TOP: Solving Rationals}
441 ANS:
\[
\begin{align*}
\frac{3}{4} &= \frac{-(x + 11)}{4x} + \frac{1}{2x} \\
\frac{3}{4} &= \frac{-x - 11}{4x} + \frac{2}{4x} \\
\frac{3}{4} &= \frac{-x - 9}{4x} \\
12x &= -4x - 36 \\
16x &= -36 \\
x &= \frac{9}{4}
\end{align*}
\]

PTS: 4 REF: 061137ia STA: A.A.26 TOP: Solving Rationals

442 ANS:
\[
\begin{align*}
\frac{m}{5} + \frac{3(m - 1)}{2} &= 2(m - 3) \\
\frac{2m}{10} + \frac{15(m - 1)}{10} &= 2m - 6 \\
\frac{17m - 15}{10} &= 2m - 6 \\
17m - 15 &= 20m - 60 \\
45 &= 3m \\
15 &= m
\end{align*}
\]

PTS: 4 REF: 081139ia STA: A.A.25 TOP: Solving Equations with Fractional Expressions

443 ANS:

PTS: 4 REF: 061139ia STA: A.G.7 TOP: Systems of Linear Inequalities
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

ANS:
24,435.19. $30000(0.95)^4 \approx 24435.19$

PTS: 4 REF: 011138ia STA: A.A.9 TOP: Exponential Functions

ANS:
39, 63. $\tan 52 = \frac{50}{x} \cdot \sin 52 = \frac{50}{x}$
\[ x \approx 39 \quad x \approx 63 \]

PTS: 4 REF: 060937ia STA: A.A.44 TOP: Using Trigonometry to Find a Side

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

ANS:

PTS: 4 REF: 061039ia STA: A.G.9 TOP: Quadratic-Linear Systems

ANS:
(T,J,F), (T,J,N), (T,K,F), (T,K,N), (T,C,F), (T,C,N), (B,J,F), (B,J,N), (B,K,F), (B,K,N), (B,C,F), (B,C,N), (S,J,F),

PTS: 4 REF: 061138IA STA: A.S.19 TOP: Sample Space
450 ANS:

\[ \text{points graph} \]

PTS: 4 REF: 080839ia STA: A.G.9 TOP: Quadratic-Linear Systems

451 ANS:
225000, 175000, the median better represents the value since it is closer to more values than the mean.

PTS: 4 REF: fall0737ia STA: A.S.4 TOP: Frequency Histograms, Bar Graphs and Tables

452 ANS:
Hat \( A \), add 1 not green to Hat \( A \), add 11 green to Hat \( B \), and add none to Hat \( C \).

PTS: 4 REF: 081038ia STA: A.S.22 TOP: Theoretical Probability

453 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: 081038ia STA: A.S.23 TOP: Theoretical Probability KEY: dependent events

454 ANS:
\[ \frac{4}{12} \times \frac{2}{11} \times \frac{1}{10} = \frac{8}{1320} \] \[ \frac{6}{12} \times \frac{5}{11} \times \frac{4}{10} = \frac{24}{1320} \] \[ \frac{4}{12} \times \frac{3}{11} \times \frac{2}{10} = \frac{120}{1320} \] \[ \frac{24}{1320} + \frac{120}{1320} = \frac{144}{1320} \]

PTS: 4 REF: 081137ia STA: A.S.23 TOP: Theoretical Probability

455 ANS:
m = 50¢, \( p = 15¢ \). \( 3m + 2p = 1.80 \). \( 9m + 6p = 5.40 \). \( 4(0.5) + 6p = 2.90 \)
\[ 4m + 6p = 2.90 \] \[ 4m + 6p = 2.90 \]
\[ 6p = 90 \]
\[ 5m = 2.50 \]
\[ p = $0.15 \]
\[ m = $0.50 \]

PTS: 3 REF: 080837ia STA: A.A.7 TOP: Writing Linear Systems
\[
\frac{x^2 + 9x + 14}{x^2 - 49} \div \frac{3x + 6}{x^2 + x - 56} = \frac{(x + 7)(x + 2)}{(x + 7)(x - 7)} \cdot \frac{(x + 8)(x - 7)}{3(x + 2)} = \frac{x + 8}{3}
\]

PTS: 4  REF: 061037ia  STA: A.A.18  TOP: Multiplication and Division of Rationals

\[
\begin{align*}
w(w + 15) &= 54, 3, 18. \\
w(w + 15) &= 54 \\
w^2 + 15w - 54 &= 0 \\
(w + 18)(w - 3) &= 0 \\
w &= 3
\end{align*}
\]

PTS: 4  REF: 060837ia  STA: A.A.8  TOP: Geometric Applications of Quadratics
\[ \frac{x - 7}{3x} \cdot \frac{2x^2 - 8x - 42}{6x^2} + \frac{x^2 - 9}{x^2 - 3x} = \frac{2(x^2 - 4x - 21)}{6x^2} \cdot \frac{x(x - 3)}{(x + 3)(x - 3)} = \frac{(x - 7)(x + 3)}{3x} \cdot \frac{1}{x + 3} = \frac{x - 7}{3x} \]

PTS: 4  REF: 080937ia  STA: A.A.18  TOP: Multiplication and Division of Rationals

ANS:

PTS: 4  REF: 080938ia  STA: A.G.7  TOP: Solving Linear Systems

ANS:

\[ 618.45, 613.44, 0.008 \quad 21.7 \times 28.5 = 618.45 \quad 21.6 \times 28.4 = 613.44 \quad \left| \frac{618.45 - 613.44}{613.44} \right| \approx 0.008 \quad \text{An error of less than 1% would seem to be insignificant.} \]

PTS: 4  REF: 060838ia  STA: A.M.3  TOP: Error

KEY: area

ANS:

\[ 315,000, 180,000, \text{the median better represents value since it is closer to more prices than the mean.} \]

PTS: 4  REF: 060839ia  STA: A.S.4  TOP: Frequency Histograms, Bar Graphs and Tables

ANS:

PTS: 4  REF: 081037ia  STA: A.G.7  TOP: Systems of Linear Inequalities
(1, -3) is in the solution set. $4(1) - 3(-3) > 9$

$4 + 9 > 9$

PTS: 4       REF: 011038ia       STA: A.G.6       TOP: Linear Inequalities

30, 20, 71-80, 81-90 and 91-100

PTS: 4       REF: 061038ia       STA: A.S.9       TOP: Frequency Histograms, Bar Graphs and Tables

PTS: 4       REF: 060939ia       STA: A.G.9       TOP: Quadratic-Linear Systems

PTS: 4       REF: 080838ia       STA: A.S.5       TOP: Frequency Histograms, Bar Graphs and Tables       KEY: cumulative frequency histograms