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 indispensible 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: 1  REF: 010905ia  STA: A.G.4  TOP: Families of Functions

2 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

3 ANS: 3  REF: 060817ia  STA: A.A.15  TOP: Undefined Rationals

4 ANS: 2  
The two values are shoe size and height.

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

5 ANS: 2  REF: 080901ia  STA: A.A.4  TOP: Modeling Equations

6 ANS: 4  
The transformation is a reflection in the x-axis.

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

7 ANS: 4  
\[ A = lw = (3w - 7)(w) = 3w^2 - 7w \]

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

8 ANS: 4  
\[ m = \frac{-3 - 1}{2 - 5} = \frac{-4}{-3} = \frac{4}{3} \]

REF: 011215ia  STA: A.A.33  TOP: Slope

9 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

10 ANS: 3  REF: 060808ia  STA: A.N.8  TOP: Permutations

11 ANS: 1  
The slope of both is −4.

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

12 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
13 ANS: 1  
$\sin C = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{13}{85}$  
REF: fall0721ia STA: A.A.42 TOP: Trigonometric Ratios

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

15 ANS: 2  
$P = 2l + 2w$  
$P - 2l = 2w$  
$\frac{P - 2l}{2} = w$

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

16 ANS: 1  
REF: 080902ia STA: A.A.19 TOP: Factoring the Difference of Perfect Squares

17 ANS: 2  
REF: fall0701ia STA: A.S.7 TOP: Scatter Plots

18 ANS: 2  
REF: 080815ia STA: A.G.1 TOP: Compositions of Polygons and Circles  
KEY: area

19 ANS: 2  
$\left| \frac{149.6 - 174.2}{149.6} \right| = 0.1644$

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

20 ANS: 3  
$2\sqrt{45} = 2\sqrt{9} \sqrt{5} = 6\sqrt{5}$

REF: 011203ia STA: A.N.2 TOP: Simplifying Radicals

21 ANS: 4  

REF: 080822ia STA: A.S.8 TOP: Scatter Plots

22 ANS: 4  
$\frac{344 \text{ m}}{\text{sec}} \times \frac{60 \text{ sec}}{1 \text{ min}} \times \frac{60 \text{ min}}{1 \text{ hr}} = 1,238,400 \frac{\text{m}}{\text{hr}}$

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

23 ANS: 4  
REF: fall0730ia STA: A.G.3 TOP: Defining Functions
24 ANS: 3
\[ | -5(5) + 12 | = |-13 | = 13 \]
REF: 080923ia STA: A.N.6 TOP: Evaluating Expressions

25 ANS: 1
\[ s = \frac{2x + t}{r} \]
\[ rs = 2x + t \]
\[ rs - t = 2x \]
\[ \frac{rs - t}{2} = x \]
REF: 011228ia STA: A.A.23 TOP: Transforming Formulas

26 ANS: 2
\[ x^2 + 5x + 6 = -x + 1 \]
\[ y = -x + 1 \]
\[ x^2 + 6x + 5 = 0 \]
\[ = -(5) + 1 \]
\[ (x + 5)(x + 1) = 0 \]
\[ = 6 \]
\[ x = -5 \text{ or } -1 \]
REF: 080812ia STA: A.A.11 TOP: Quadratic-Linear Systems

27 ANS: 3
\[ 5x + 2y = 48 \]
\[ 3x + 2y = 32 \]
\[ 2x = 16 \]
\[ x = 8 \]
REF: fall0708ia STA: A.A.10 TOP: Solving Linear Systems

28 ANS: 3
\[ \text{mean} = 6, \text{median} = 6 \text{ and mode} = 7 \]
REF: 080804ia STA: A.S.4 TOP: Central Tendency

29 ANS: 4
REF: fall0715ia STA: A.A.5 TOP: Modeling Inequalities

30 ANS: 3
\[ \cos 30 = \frac{x}{24} \]
\[ x \approx 21 \]
REF: 010912ia STA: A.A.44 TOP: Using Trigonometry to Find a Side
31 ANS: 2  REF: 011201ia  STA: A.A.19
TOP: Factoring the Difference of Perfect Squares
32 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
33 ANS: 4
$$\frac{25x - 125}{x^2 - 25} = \frac{25(x - 5)}{(x + 5)(x - 5)} = \frac{25}{x + 5}$$

REF: 080821ia  STA: A.A.16  TOP: Rational Expressions
KEY: $a > 0$
34 ANS: 4
$16^2 + b^2 = 34^2$

$$b^2 = 900$$

$$b = 30$$

REF: 080809ia  STA: A.A.45  TOP: Pythagorean Theorem
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  REF: 060904ia  STA: A.A.1  TOP: Expressions
37 ANS: 4
$5p - 1 = 2p + 20$

$$3p = 21$$

$$p = 7$$

REF: 080801ia  STA: A.A.22  TOP: Solving Equations
38 ANS: 4  REF: fall0704ia  STA: A.A.29  TOP: Set Theory
39 ANS: 2
$$m = \frac{5 - 3}{2 - 7} = \frac{2}{5}$$

REF: 010913ia  STA: A.A.33  TOP: Slope
40 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

41 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

42 ANS: 2
\[ \sin U = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{15}{17} \]

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

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

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

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

46 ANS: 2
\[ L + S = 47 \]
\[ L - S = 15 \]
\[ 2L = 62 \]
\[ L = 31 \]

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

47 ANS: 2 REF: 080802ia STA: A.N.1 TOP: Identifying Properties
68 ANS: 4

\[ x^2 - 2 = x \quad \text{Since } y = x, \text{ the solutions are } (2, 2) \text{ and } (-1, -1). \]
\[ x^2 - x - 2 = 0 \]
\[ (x - 2)(x + 1) = 0 \]
\[ x = 2 \text{ or } -1 \]

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

49 ANS: 3

0.75 hours = 45 minutes.
\[
\frac{120}{I} = \frac{x}{45}
\]
\[ x = 5400 \]

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

50 ANS: 4

\[ \frac{2^6}{2^4} = 2^5 \]

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

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

52 ANS: 4

\[ y = mx + b \]
\[ -1 = (2)(3) + b \]
\[ b = -7 \]

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

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

54 ANS: 1

A rooster crows before sunrise, not because of the sun.

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

55 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

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

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

58 ANS: 1  REF: 011210ia  STA: A.G.6  TOP: Linear Inequalities
59 ANS: 1
\[ \frac{\sqrt{32}}{4} = \frac{\sqrt{16 \cdot 2}}{4} = \sqrt{2} \]

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

60 ANS: 2
\[ \frac{6}{4a} - \frac{2}{3a} = \frac{18a - 8a}{12a^2} = \frac{10a}{12a^2} = \frac{5}{6a} \]

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

61 ANS: 1
\[ 3x^2 - 27x = 0 \]
\[ 3x(x - 9) = 0 \]
\[ x = 0, 9 \]

REF: 011223ia STA: A.A.28 TOP: Roots of Quadratics

62 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

63 ANS: 1
If the area of the square is 36, a side is 6, the diameter of the circle is 6, and its radius is 3. \[ A = \pi r^2 = 3^2 \pi = 9\pi \]

REF: 011217ia STA: A.G.1 TOP: Compositions of Polygons and Circles

KEY: area

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

REF: 060925ia STA: A.A.10 TOP: Solving Linear Systems
\[
\left(\frac{4x^{-1}}{2x}\right)^2 = \frac{16x^6}{2x} = 8x^5
\]

REF: 011216ia STA: A.A.12 TOP: Powers of Powers

ANS: 1

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

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

ANS: 4

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

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

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

ANS: 1

REF: fall0723ia STA: A.M.3 TOP: Error

KEY: area

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

ANS: 1

\[x^2 + 5x - 6 = 0\]
\[(x + 6)(x - 1) = 0\]
\[x = -6, 1\]

REF: 011214ia STA: A.A.15 TOP: Undefined Rationals

ANS: 2

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

KEY: subtraction

ANS: 1

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

ANS: 1

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

ANS: 4

REF: 060829ia STA: A.G.5 TOP: Graphing Quadratic Functions
77 ANS: 4
\[-4x + 2 > 10\]
\[-4x > 8\]
\[x < -2\]

REF: 080805ia STA: A.A.21 TOP: Interpreting Solutions

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

79 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

80 ANS: 3
The other situations are quantitative.

REF: 060905ia STA: A.S.1 TOP: Analysis of Data

81 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

82 ANS: 2
REF: 010916ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph

83 ANS: 2
\[\sqrt{32} = \sqrt{16 \times 2} = 4\sqrt{2}\]

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

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

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

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

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

86 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
87 ANS: 1
\[ x - 2y = 1 \]
\[ x + 4y = 7 \]
\[ -6y = -6 \]
\[ y = 1 \]

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

88 ANS: 3
KEY: mutually exclusive events

REF: fall0702ia STA: A.S.23 TOP: Theoretical Probability

89 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

90 ANS: 3
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

91 ANS: 2
\[ x^2 - x - 20 = 3x - 15 \]
\[ y = 3x - 15 \]
\[ x^2 - 4x - 6 = 0 \]
\[ (x - 5)(x + 1) = 0 \]
\[ x = 5 \text{ or } -1 \]

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

92 ANS: 4
\[ A = \{2, 4, 6, 8, 10, 12, 14, 16, 18, 20\} \]

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

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

94 ANS: 3
\[ \sqrt{72} = \sqrt{36 \times 2} = 6\sqrt{2} \]

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

95 ANS: 2
The volume of the cube using Ezra’s measurements is 8 (2³). The actual volume is 9.261 (2.1³). 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
96 ANS: 4 REF: 080903ia STA: A.A.12 TOP: Multiplication of Powers
97 ANS: 3 REF: 060924ia STA: A.G.8 TOP: Solving Quadratics by Graphing
98 ANS: 4
\[
\frac{5}{45} = \frac{8}{x}
\]
\[5x = 360\]
\[x = 72\]

REF: 060901ia STA: A.M.1 TOP: Speed
99 ANS: 1
\[y = mx + b\]
\[-6 = (-3)(4) + b\]
\[b = 6\]

REF: 060922ia STA: A.A.34 TOP: Writing Linear Equations
100 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
101 ANS: 4 REF: 080825ia STA: A.A.40 TOP: Systems of Linear Inequalities
102 ANS: 1
\[
\frac{4x}{x - 1} \cdot \frac{x^2 - 1}{3x + 3} = \frac{4x}{x - 1} \cdot \frac{(x + 1)(x - 1)}{3(x + 1)} = \frac{4x}{3}
\]

REF: 080826ia STA: A.A.18 TOP: Multiplication and Division of Rationals
KEY: multiplication
103 ANS: 3
\[35000(1 - 0.05)^4 \approx 28507.72\]

REF: fall0719ia STA: A.A.9 TOP: Exponential Functions
104 ANS: 3
\[(3 - 1) \times 2 \times 3 = 12\]

REF: 080905ia STA: A.N.7 TOP: Conditional Probability
105 ANS: 3 REF: 011205ia STA: A.A.1 TOP: Expressions
106 ANS: 4

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

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

\[
\frac{6x + 5}{15} = \frac{7x - 2}{15}
\]

\[
6x + 5 = 7x - 2
\]

\[
x = 7
\]

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

107 ANS: 1

REF: 011207ia STA: A.G.9 TOP: Quadratic-Linear Systems

108 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

109 ANS: 1

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

110 ANS: 1

\[
\sqrt{1700^2 - 1300^2} \approx 1095
\]

REF: 011221ia STA: A.A.45 TOP: Pythagorean Theorem

111 ANS: 3

The other situations are quantitative.

REF: 060819ia STA: A.S.1 TOP: Analysis of Data

112 ANS: 2

REF: 080823ia STA: A.A.32 TOP: Slope
113 ANS: 3
\[ \tan \angle PLM = \frac{\text{opposite}}{\text{adjacent}} = \frac{4}{3} \]

REF: 011226ia STA: A.A.42 TOP: Trigonometric Ratios

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

115 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

116 ANS: 2 REF: 011212ia STA: A.S.23 TOP: Theoretical Probability
KEY: independent events

117 ANS: 3 REF: 010917ia STA: A.A.29 TOP: Set Theory

118 ANS: 2

\[ 5\sqrt{20} = 5\sqrt{4\sqrt{5}} = 10\sqrt{5} \]

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

119 ANS: 3 REF: 011224ia STA: A.N.1 TOP: Properties of Reals

120 ANS: 3 REF: 080819ia STA: A.A.13 TOP: Addition and Subtraction of Polynomials
KEY: subtraction

121 ANS: 2 REF: 060821ia STA: A.A.5 TOP: Modeling Inequalities

122 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

123 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

124 ANS: 1

\[ \frac{1}{8} \times \frac{1}{8} = \frac{1}{64} \]

REF: 010928ia STA: A.S.23 TOP: Geometric Probability
125 ANS: 1
so = f + 60 \quad j = 2f - 50 \quad se = 3f \quad f + (f + 60) + (2f - 50) + 3f = 1424
\begin{align*}
7f + 10 & = 1424 \\
7f & = 1424 - 10 \\
7f & = 1414 \\
f & = 202
\end{align*}

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

126 ANS: 1
\begin{align*}
x & = \frac{-b}{2a} \\
& = \frac{-(3)}{2(2)} \\
& = \frac{3}{4}
\end{align*}

REF: 011219ia STA: A.A.41 TOP: Identifying the Vertex of a Quadratic Given Equation

127 ANS: 3 REF: 060825ia STA: A.A.45 TOP: Pythagorean Theorem
128 ANS: 4 REF: 010930ia STA: A.G.3 TOP: Defining Functions
129 ANS: 3
\begin{align*}
F & = \frac{9}{5} C + 32 \\
& = \frac{9}{5} (15) + 32 = 59
\end{align*}

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

130 ANS: 2 REF: fall0725ia STA: A.N.4 TOP: Operations with Scientific Notation
131 ANS: 4 REF: 060805ia STA: A.S.12 TOP: Scatter Plots
132 ANS: 3 REF: fall0706ia STA: A.A.19 TOP: Factoring the Difference of Perfect Squares
133 ANS: 4 REF: 060906ia STA: A.A.4 TOP: Modeling Inequalities
134 ANS: 2
\begin{align*}
2x^2 + 10x - 12 & = 2(x^2 + 5x - 6) = 2(x + 6)(x - 1)
\end{align*}

REF: 080806ia STA: A.A.20 TOP: Factoring Polynomials
135 ANS: 4 REF: 010927ia STA: A.N.4 TOP: Operations with Scientific Notation
136 ANS: 1
\begin{align*}
\frac{2}{x} - 3 & = \frac{26}{x} \\
-3 & = \frac{24}{x} \\
x & = -8
\end{align*}

REF: 010918ia STA: A.A.26 TOP: Solving Rationals
137 ANS: 2
\begin{align*}
1.5^3 & = 3.375
\end{align*}

REF: 060809ia STA: A.G.2 TOP: Volume
138 ANS: 1
\[ x^2 + 7x + 10 = 0 \]
\[ (x + 5)(x + 2) = 0 \]
\[ x = -5 \text{ or } -2 \]

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

139 ANS: 4
\[ w(w + 5) = 36 \]
\[ w^2 + 5w - 36 = 0 \]

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

140 ANS: 1 REF: 060811ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph

141 ANS: 2 REF: 011227ia STA: A.A.3 TOP: Expressions

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

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

143 ANS: 4
\[ 25(x - 3) = 25x - 75 \]

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

144 ANS: 4 REF: 011229ia STA: A.S.8 TOP: Scatter Plots

145 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

146 ANS: 2
\[ \tan 32 = \frac{x}{25} \]
\[ x \approx 15.6 \]

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

147 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

148 ANS: 1 REF: 011213ia STA: A.A.13 TOP: Addition and Subtraction of Polynomials
KEY: addition
149 ANS: 3  REF: 060919ia  STA: A.G.3  TOP: Defining Functions
150 ANS: 1  REF: 080803ia  STA: A.A.4  TOP: Modeling Inequalities
151 ANS: 3  REF: 011204ia  STA: A.G.3  TOP: Defining Functions
152 ANS: 3  REF: 011220ia  STA: A.S.6  TOP: Box-and-Whisker Plots
153 ANS: 3  
\[3ax + b = c\]
\[3ax = c - b\]
\[x = \frac{c - b}{3a}\]

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

154 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: \(a > 0\)

155 ANS: 1  
\[m = \frac{3 - 0}{0 - 2} = \frac{3}{2}\]. 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

156 ANS: 3  REF: 060926ia  STA: A.N.1  TOP: Properties of Reals
157 ANS: 1  
\[\left|\frac{289 - 282}{289}\right| \approx 0.024\]

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

158 ANS: 4  REF: 060916ia  STA: A.A.15  TOP: Undefined Rationals

159 ANS: 3  
\[\frac{(2x^3)(8x^3)}{4x^6} = \frac{16x^8}{4x^6} = 4x^2\]

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

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

161 ANS: 3  REF: fall0705ia  STA: A.N.1  TOP: Identifying Properties
162 ANS: 4  
The mean is \(80.\overline{6}\), the median is 84.5 and the mode is 87.

REF: 010907ia  STA: A.S.4  TOP: Central Tendency
163  ANS: 4

\[
\begin{align*}
\frac{5}{x} &= \frac{x + 13}{6} \\
x^2 + 13x &= 30 \\
x^2 + 13x - 30 &= 0 \\
(x + 15)(x - 2) &= 0 \\
x &= -15 \text{ or } 2
\end{align*}
\]

REF: 060826ia  STA: A.A.26  TOP: Solving Rationals

164  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

165  ANS: 2

REF: 080916ia  STA: A.G.8  TOP: Solving Quadratics by Graphing

166  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

167  ANS: 1

\[
13.95 + 0.49s \leq 50.00 \\
0.49s \leq 36.05 \\
s \leq 73.57
\]

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

168  ANS: 4

\[
V = \pi r^2 h = \pi \cdot 6^2 \cdot 15 \approx 1696.5
\]

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

169  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
170 ANS: 1
\[ m = \frac{4 - (-4)}{-5 - 15} = -\frac{2}{5} \]
REF: 080915ia STA: A.A.33 TOP: Slope
171 ANS: 4 REF: 011225ia STA: A.A.31 TOP: Set Theory
172 ANS: 3
\begin{align*}
  b &= 42 - r \\
  r &= 2b + 3 \\
  r &= 2b + 3 \\
  r &= 2(42 - r) + 3 \\
  r &= 84 - 2r + 3 \\
  3r &= 87 \\
  r &= 29
\end{align*}
REF: 060812ia STA: A.A.7 TOP: Writing Linear Systems
173 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
175 ANS: 3
\[ 25 - 18 = 7 \]
REF: 060822ia STA: A.S.9 TOP: Frequency Histograms, Bar Graphs and Tables
176 ANS: 3 REF: fall0710ia STA: A.A.31 TOP: Set Theory
177 ANS: 4
\begin{align*}
  -2(x - 5) &< 4 \\
  -2x + 10 &< 4 \\
  -2x &< -6 \\
  x &> 3
\end{align*}
REF: 080913ia STA: A.A.21 TOP: Interpreting Solutions
178 ANS: 4 REF: 010929ia STA: A.S.6 TOP: Box-and-Whisker Plots
179 ANS: 1 REF: fall0728ia STA: A.A.15 TOP: Undefined Rationals
180 ANS: 2
The slope of the inequality is \( -\frac{1}{2} \).
REF: fall0720ia STA: A.G.6 TOP: Linear Inequalities
181 ANS: 4
The transformation is a reflection in the x-axis.
REF: 011206ia STA: A.G.5 TOP: Graphing Absolute Value Functions
\[
\frac{x^2 - 1}{x + 1} \cdot \frac{x + 3}{3x - 3} = \frac{(x + 1)(x - 1)}{x + 1} \cdot \frac{x + 3}{3(x - 1)} = \frac{x + 3}{3}
\]

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

184 ANS: 2
The other sets of data are qualitative.

REF: 011211ia STA: A.S.1 TOP: Analysis of Data

185 ANS: 2
\[
\sin A = \frac{8}{12}
\]

\[A \approx 42\]

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

186 ANS: 2
REF: 010915ia STA: A.A.5 TOP: Modeling Equations
187 ANS: 2
REF: 080930ia STA: A.S.17 TOP: Scatter Plots
188 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

189 ANS: 4
REF: 060930ia STA: A.A.29 TOP: Set Theory
190 ANS: 2
REF: 080810ia STA: A.A.36 TOP: Parallel and Perpendicular Lines
191 ANS: 1
REF: 011202ia STA: A.A.9 TOP: Exponential Functions
192 ANS: 3
\[
3^2 + 5^2 = x^2
\]

\[34 = x^2\]

\[\sqrt{34} = x\]

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

193 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

194 ANS: 1
REF: 080813ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph

195 ANS: 4
REF: 011222ia STA: A.A.29 TOP: Set Theory
196 ANS: 2
REF: 060830ia STA: A.A.9 TOP: Exponential Functions
197 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

198 ANS: 1
−2x + 5 > 17
−2x > 12
x < −6

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

199 ANS: 2
s + o = 126. s + 2s = 126
  o = 2s  s = 42

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

200 ANS: 4
distance _= 24 = 4
  time 6

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

201 ANS: 4
(d × 3) + (2 × 2d) _= 3d + 4d = 7d
  2 × 3 6 6

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

202 ANS: 1
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

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

204 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

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

206 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
207 \ 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

208 \ ANS: \ 1 \\
8^2 + 15^2 = c^2 \\
c^2 = 289 \\
c = 17 \\

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

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

210 \ ANS: \ 3 \\
\sin A = \frac{10}{16} \quad B = 180 - (90 = 38.7) = 51.3 \quad A \ 90^\circ \text{ angle is not acute.} \\
A \approx 38.7 \\

REF: \ 080829ia \ STA: \ A.A.43 \ TOP: \ Using Trigonometry to Find an Angle
Integrated Algebra Multiple Choice Regents Exam Questions
Answer Section

211 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

212 ANS: 2 REF: 061023ia STA: A.A.23 TOP: Transforming Formulas

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

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

214 ANS: 1 REF: 061021ia STA: A.A.29 TOP: Set Theory

215 ANS: 3
Frequency is not a variable.

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

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

217 ANS: 3 REF: 061003ia STA: A.A.13 TOP: Addition and Subtraction of Polynomials
KEY: addition

218 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

219 ANS: 3
\[2(1) + 3 = 5\]

REF: 061007ia STA: A.A.39 TOP: Linear Equations

220 ANS: 1
\[b = 2j + 4\]
\[2j + 4 = 31 - j\]
\[b + j = 31\]
\[3j = 27\]
\[b = 31 - j\]
\[j = 9\]

REF: 081119ia STA: A.A.7 TOP: Writing Linear Systems
\[
\frac{2x - 3}{x - 4} = \frac{2}{3}
\]

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

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

\[
4x = 1
\]

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

**REF:** 081012ia  **STA:** A.A.26  **TOP:** Solving Rationals

222  **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

223  **ANS:** 4

\[
s = \frac{d}{t} = \frac{150\text{ m}}{1.5\text{ min}} \cdot \frac{60\text{ min}}{1\text{ hr}} = \frac{6,000\text{ m}}{\text{hr}}
\]

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

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

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

226  **ANS:** 2  **REF:** 061105ia  **STA:** A.A.20  **TOP:** Factoring Polynomials

227  **ANS:** 2  **REF:** 011002ia  **STA:** A.S.20  **TOP:** Theoretical Probability

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

229  **ANS:** 4  **REF:** 061001ia  **STA:** A.A.30  **TOP:** Set Theory

230  **ANS:** 2

shaded = whole – unshaded

\[
= \text{rectangle-triangle}
\]

\[
= lh - \frac{1}{2}bh
\]

\[
= 15 \times 6 - \frac{1}{2} \times 15 \times 4.6
\]

\[
= 90 - 34.5
\]

\[
= 55.5
\]

**REF:** 081019ia  **STA:** A.G.1  **TOP:** Compositions of Polygons and Circles

**KEY:** area

231  **ANS:** 1  **REF:** 081110ia  **STA:** A.A.1  **TOP:** Expressions
232 ANS: 4
\[ \frac{x}{x + 4} \div \frac{2x}{x^2 - 16} = \frac{x}{x + 4} \times \frac{x^2 - 16}{2x} = \frac{1}{x + 4} \times \frac{(x + 4)(x - 4)}{2} = \frac{x - 4}{2} \]

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

233 ANS: 2
\[ \frac{55.42 - 50.27}{55.42} = 0.093 \]

REF: 081023ia STA: A.M.3 TOP: Error KEY: area

234 ANS: 1
1P + 2C = 5
1P + 4C = 6

\[ 2C = 1 \]
\[ C = 0.5 \]

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

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

236 ANS: 2 REF: 061115ia STA: A.S.7 TOP: Scatter Plots

237 ANS: 4
The other sets of data are qualitative.

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

238 ANS: 2
A(−3, 8) and B(3, 6). \[ m = \frac{8 - 6}{-3 - 3} = \frac{2}{-6} = -\frac{1}{3} \]

REF: 081005ia STA: A.A.33 TOP: Slope

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

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

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

241 ANS: 2 REF: 061122ia STA: A.S.14 TOP: Analysis of Data
\[ \cos 38 = \frac{10}{x} \]

\[ x = \frac{10}{\cos 38} \approx 12.69 \]

REF: 081126ia  STA: A.A.44  TOP: Using Trigonometry to Find a Side

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

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

244  ANS: 4
\[ \frac{e y}{n} + k = t \]
\[ \frac{e y}{n} = t - k \]
\[ y = \frac{n(t - k)}{e} \]

REF: 011125ia  STA: A.A.23  TOP: Transforming Formulas

245  ANS: 2
\[ \tan B = \frac{\text{opposite}}{\text{adjacent}} = \frac{8}{15} = 0.53 \]

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

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

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

247  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

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

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

249  ANS: 1  REF: 011001ia  STA: A.S.6  TOP: Box-and-Whisker Plots
Asking school district employees about a school board candidate produces the most bias.

The other situations are quantitative.

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

\[
\sin \alpha = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{28}{53}
\]

\[
\cos \alpha = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{15}{17}
\]
261 ANS: 1
\[-3(-4)^2(2) + 4(-4) = -96 - 16 = -112\]

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

262 ANS: 1 REF: 061010ia STA: A.A.40 TOP: Systems of Linear Inequalities

263 ANS: 4 REF: 081107ia STA: A.A.5 TOP: Modeling Inequalities

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

265 ANS: 3 REF: 011117ia STA: A.G.4 TOP: Graphing Absolute Value Functions

266 ANS: 2 REF: 081127ia STA: A.A.40 TOP: Systems of Linear Inequalities

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

268 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

269 ANS: 4 REF: 011025ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

270 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

271 ANS: 4
\[
\frac{x + 2}{x - 2} = \frac{-3}{x}
\]
\[
x(x + 2) = -3(x - 2)
\]
\[
x^2 + 2x = -3x + 6
\]
\[
x^2 + 5x - 6 = 0
\]
\[
(x + 6)(x - 1) = 0
\]
\[
x = -6 \text{ or } 1
\]

REF: 011028ia STA: A.A.26 TOP: Solving Rationals
272 ANS: 1

\[ 2y - 2x = 10 \quad \text{axis of symmetry: } x = \frac{-b}{2a} = \frac{-2}{2(1)} = -1 \]

\[ 2y = 2x + 10 \]

\[ y = x + 5 \]

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

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

274 ANS: 3

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

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

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

276 ANS: 2

\[ \tan \theta = \frac{\text{opposite}}{\text{adjacent}} = \frac{14}{48} \]

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

277 ANS: 4 REF: 081022ia STA: A.A.29 TOP: Set Theory

278 ANS: 4 REF: 061013ia STA: A.G.3 TOP: Defining Functions

279 ANS: 2

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

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

280 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

281 ANS: 3 REF: 081171ia STA: A.A.29 TOP: Set Theory

282 ANS: 3

\[ x^2 - 9 = 0 \]

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

\[ x = \pm3 \]

REF: 061014ia STA: A.A.15 TOP: Undefined Rationals
283 ANS: 2
\[ x^2 - 2x - 15 = 0 \]
\[ (x - 5)(x + 3) = 0 \]
\[ x = 5 \quad x = -3 \]

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

284 ANS: 3
\[ V = \pi r^2h = \pi \cdot 5^2 \cdot 2.3 \approx 180.6 \]

REF: 081105ia STA: A.G.2 TOP: Volume

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

286 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

287 ANS: 4
\[ _5P_5 = 5 \times 4 \times 3 \times 2 \times 1 = 120 \]

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

288 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

289 ANS: 2
\[ \tan ABC = \frac{\text{opposite}}{\text{adjacent}} = \frac{5}{12} \]

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

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

291 ANS: 3
\[ P(\text{odd}) = \frac{3}{6}, \quad P(\text{prime}) = \frac{3}{6}, \quad P(\text{perfect square}) = \frac{2}{6}, \quad P(\text{even}) = \frac{3}{6} \]

REF: 061104ia STA: A.S.22 TOP: Geometric Probability
\[
\begin{align*}
\frac{7}{12x} - \frac{y}{6x^2} &= \frac{42x^2 - 12xy}{72x^3} = \frac{6x(7x - 2y)}{72x^3} = \frac{7x - 2y}{12x^2} \\
\text{REF: 061129ia} & \quad \text{STA: A.A.17} & \text{TOP: Addition and Subtraction of Rationals}
\end{align*}
\]

293 ANS: 4

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

\[
20x = 4500
\]

\[
x = 225
\]

\[
\text{REF: 081101ia} & \quad \text{STA: A.N.5} & \text{TOP: Direct Variation}
\]

294 ANS: 2

\[
\text{REF: 081003ia} & \quad \text{STA: A.A.31} & \text{TOP: Set Theory}
\]

295 ANS: 1

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

\[
\text{REF: 011127ia} & \quad \text{STA: A.A.41} & \text{TOP: Identifying the Vertex of a Quadratic Given Equation}
\]

296 ANS: 1

\[
\text{REF: 081015ia} & \quad \text{STA: A.G.5} & \text{TOP: Graphing Quadratic Functions}
\]

297 ANS: 2

\[
\text{REF: 011019ia} & \quad \text{STA: A.S.12} & \text{TOP: Scatter Plots}
\]

298 ANS: 2

\[
\text{REF: 061027ia} & \quad \text{STA: A.A.20} & \text{TOP: Factoring Polynomials}
\]

299 ANS: 2

\[
\text{REF: 061113ia} & \quad \text{STA: A.G.5} & \text{TOP: Graphing Quadratic Functions}
\]

300 ANS: 3

\[
x = \frac{-b}{2a} = \frac{-10}{2(-1)} = 5.
\]

\[
\text{REF: 081018ia} & \quad \text{STA: A.A.41} & \text{TOP: Identifying the Vertex of a Quadratic Given Equation}
\]

301 ANS: 2

\[
\text{Candidate B received 45\%.} \quad 45\% \times 1860 = 837
\]

\[
\text{REF: 081007ia} & \quad \text{STA: A.N.5} & \text{TOP: Percents}
\]

302 ANS: 2

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

\[
\text{REF: 011122ia} & \quad \text{STA: A.A.37} & \text{TOP: Slope}
\]

303 ANS: 3

\[
2x - 5y = 11 \quad 2x - 5(-1) = 11
\]

\[
-2x + 3y = -9 \quad 2x = 6
\]

\[
-2y = 2 \quad x = 3
\]

\[
y = -1
\]

\[
\text{REF: 081109ia} & \quad \text{STA: A.A.10} & \text{TOP: Solving Linear Systems}
\]

304 ANS: 4

\[
\text{REF: 011020ia} & \quad \text{STA: A.A.12} & \text{TOP: Multiplication of Powers}
\]
305 ANS: 3 REF: 081009ia STA: A.A.30 TOP: Set Theory

306 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

307 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

308 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

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

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

310 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

311 ANS: 3
\[\sqrt{72} - 3\sqrt{2} = \sqrt{36 \times 2} - 3\sqrt{2} = 6\sqrt{2} - 3\sqrt{2} = 3\sqrt{2}\]

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

312 ANS: 2 REF: 011005ia STA: A.A.5 TOP: Modeling Inequalities

313 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
314 ANS: 4
\[ sP_3 = 336 \]

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

315 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

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

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

317 ANS: 4
\[ 9.2 \times 10^6 \]
\[ 2.3 \times 10^2 = 4 \times 10^4 \]

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

318 ANS: 3
\[ m = \frac{6 - 4}{3 - (-2)} = \frac{2}{5} \]

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

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

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

320 ANS: 3
\[ 10^2 + 10^2 = c^2 \]
\[ c^2 = 200 \]
\[ c \approx 14.1 \]

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

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

322 ANS: 2 REF: 011023ia STA: A.A.40 TOP: Systems of Linear Inequalities
323 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

324 ANS: 3
\[ \frac{1}{4}P_4 = 360 \]

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

325 ANS: 2
\[ \frac{|13.5 - 12.8|}{13.5} \approx 0.093 \]

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

326 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

327 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

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

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

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

330 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
331 ANS: 4
\[ x^2 - 4x - 12 = 0 \]
\[ (x - 6)(x + 2) = 0 \]
\[ x = 6, x = -2 \]

REF: 061125ia STA: A.A.15 TOP: Undefined Rationals

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

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

333 ANS: 2

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

334 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

335 ANS: 4

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

336 ANS: 3

REF: 061012ia STA: A.A.10 TOP: Solving Linear Systems

337 ANS: 1

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

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

338 ANS: 4

REF: 061112ia STA: A.A.36 TOP: Parallel and Perpendicular Lines

339 ANS: 2

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

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

340 ANS: 2

REF: 011015ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph

341 ANS: 1

REF: 081102ia STA: A.S.12 TOP: Scatter Plots
342 ANS: 4
\[ 6\sqrt{50} + 6\sqrt{2} = 6\sqrt{25 \cdot 2} + 6\sqrt{2} = 30\sqrt{2} + 6\sqrt{2} = 36\sqrt{2} \]

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

343 ANS: 2
REF: 061128ia STA: A.A.29 TOP: Set Theory

344 ANS: 3
REF: 061011ia STA: A.S.2 TOP: Analysis of Data

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

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

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

347 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

348 ANS: 4
\[ 5 \times 2 \times 3 = 30 \]

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

349 ANS: 3
\[ \frac{(10w^3)^2}{5w} = \frac{100w^6}{5w} = 20w^5 \]

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

350 ANS: 1
REF: 061005ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph

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

352 ANS: 2
REF: 011027ia STA: A.A.3 TOP: Expressions

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

354 ANS: 1
\[ y = mx + b \]
\[ 5 = (-2)(1) + b \]
\[ b = 7 \]

REF: 081108ia STA: A.A.34 TOP: Writing Linear Equations
\[ x^2 - x = x + 3 \] 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

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

REF: 011011ia STA: A.A.14 TOP: Division of Polynomials

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

REF: 081125ia STA: A.S.22 TOP: Theoretical Probability

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

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

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

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

ANS: 3

mean = 81 \( \frac{7}{11} \), median = 81 and mode = 76

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

ANS: 3 REF: 081017a STA: A.S.14 TOP: Analysis of Data

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

ANS: 2 REF: 081014ia STA: A.A.36 TOP: Parallel and Perpendicular Lines

ANS: 4 REF: 061130ia STA: A.A.13 TOP: Addition and Subtraction of Polynomials

KEY: subtraction

ANS: 2 REF: 081106ia STA: A.S.6 TOP: Box-and-Whisker Plots

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

ANS: 2

Debbie failed to distribute the 3 properly.

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

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

ANS: 4 REF: 081011ia STA: A.A.5 TOP: Modeling Equations

ANS: 1

\[ \frac{12.8 + 17.2}{3 + 5} = 3.75 \]

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

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

ANS: 3 REF: 011104ia STA: A.A.1 TOP: Expressions
\[
\frac{x^2 - x - 6}{x^2 - 5x + 6} = \frac{(x - 3)(x + 2)}{(x - 3)(x + 2)} = \frac{x + 2}{x - 2}
\]

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

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

388 ANS: 1  
\[f + m = 53\]
\[f - m = 25\]
\[2m = 28\]
\[m = 14\]

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

389 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

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

REF: 011129ia  STA: A.S.21  TOP: Experimental Probability
Integrated Algebra 2 Point Regents Exam Questions

Answer Section

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

392 ANS:
\(-3\sqrt{48} = -3\sqrt{16 \times 3} = -12\sqrt{3}\)

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

393 ANS:
\[ \frac{3}{8} \cdot P(s_1 < 4) \times P(s_2 = \text{back}) = \frac{3}{4} \times \frac{1}{2} = \frac{3}{8} \]

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

394 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

395 ANS:

\[ 3 + 2g = 5g - 9 \]

\[ 12 = 3g \]

\[ g = 4 \]

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

396 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

397 ANS:
\{1,2,4,5,9,10,12\}

PTS: 2   REF: 080833ia   STA: A.A.30   TOP: Set Theory
ANS: \( \frac{6}{25} \cdot \frac{25 - (11 + 5 + 3)}{25} \)

PTS: 2 REF: 011232ia STA: A.S.21 TOP: Experimental Probability

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

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

PTS: 2 REF: 061131ia STA: A.A.16 TOP: Rational Expressions

KEY: a > 0

ANS:
\( \frac{600 - 592}{592} \approx 0.014 \)

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

KEY: volume and surface area

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

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

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

ANS:
\( 0 \leq t \leq 40 \)

PTS: 2 REF: 060833ia STA: A.A.31 TOP: Set Theory

ANS:
\( 2.1. \) \( \cos 65 = \frac{x}{5} \)

\( x \approx 2.1 \)

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

ANS:
\( \frac{3k^2 m^6}{4} \)

PTS: 2 REF: 010932ia STA: A.A.12 TOP: Division of Powers
ANS:

5. 48 inches × \(\frac{1}{36}\) yard = \(\frac{4}{3}\) yards × $3.75 = $5.00

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

ANS:

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

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

ANS:

\[bc + ac = ab\]

\[c(b + a) = ab\]

\[c = \frac{ab}{b + a}\]

PTS: 2  REF: 081131ia  STA: A.A.23  TOP: Transforming Formulas

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

ANS:

\[77120 + 33500 = 110620\] sq. ft. \(\times \frac{1\text{ acre}}{43560\text{ sq. ft.}} \approx 2.54\) acres

PTS: 2  REF: 081133ia  STA: A.M.2  TOP: Conversions

ANS:

\[\frac{3}{8}, (H,H,H), (H,H,T), (H,T,H), (T,H,T), (T,T,H), (T,T,H), (T,T,T)\]

PTS: 2  REF: 080933ia  STA: A.S.19  TOP: Sample Space

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

ANS:

\[60. 5P_3 = 60\]

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

ANS:

(1) Distributive; (2) Commutative

PTS: 2  REF: 061132ia  STA: A.N.1  TOP: Identifying Properties
416 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

417 ANS:
\[ x = 1; \quad (1, -5) \]

PTS: 2 REF: 061133ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph

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

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

419 ANS:
\[ 147.75 \quad 2 \times 5.5 \times 3 + 2 \times 6.75 \times 3 + 2 \times 5.5 \times 6.75 = 147.75 \]

PTS: 2 REF: 011231ia STA: A.G.2 TOP: Surface Area

420 ANS:
\[
\begin{align*}
2,160 \quad &\frac{1,200}{25} = \frac{x}{45} \\
25x &= 54,000 \\
x &= 2,160
\end{align*}
\]

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

421 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

422 ANS:
\[ \text{orchestra:} \quad \frac{3}{26} > \frac{4}{36} \]

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

![Frequency Histogram](image)

PT: Frequency Histograms, Bar Graphs and Tables
KEY: frequency histograms

424 ANS:

50. \( 12 + 10 + 12 + \frac{1}{2} (10\pi) \approx 50 \)

PT: Compositions of Polygons and Circles
KEY: perimeter

425 ANS:

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

PT: Rational Expressions
KEY: \( a > 0 \)

426 ANS:

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

PT: Factoring the Difference of Perfect Squares

427 ANS:

\[
\frac{1375}{1600} - \frac{40^2 - 15^2}{40^2} = \frac{1375}{1600}
\]

PT: Geometric Probability

428 ANS:

\[
\frac{distance}{time} = \frac{89}{0.8} = 111.25
\]

PT: Speed
ANS:

36 – 9π. 15.6. Area of square–area of 4 quarter circles. \((3 + 3)^2 - 3^2 \pi = 36 - 9\pi\)
Integrated Algebra 3 Point Regents Exam Questions
Answer Section

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:
\[ x^2 + 13x - 30 = 0 \]
\[ (x + 15)(x - 2) = 0 \]
\[ x = -15, 2 \]

PTS: 3 REF: 081036ia STA: A.A.28 TOP: Roots of Quadratics

432 ANS:
81.3, 80, both increase

PTS: 3 REF: 080835ia STA: A.G.4 TOP: Graphing Exponential Functions

433 ANS:
7. 15x + 22 ≥ 120
\[ x ≥ 6.53 \]

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

435 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

436 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
ANS:

\[(x + 2)(x - 1) = 18 \]
\[x^2 - x + 2x - 2 = 18 \]
\[x^2 + x - 20 = 0 \]
\[(x + 5)(x - 4) = 0 \]
\[x = -5 \text{ or } 4 \]

KEY: division
441 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

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

PTS: 3      REF: 061134ia      STA: A.S.16      TOP: Central Tendency

443 ANS:
50, 1.5, 10. \(\frac{\text{distance}}{\text{time}} = \frac{60}{1.2} = 50.\) \(\frac{\text{distance}}{\text{time}} = \frac{60}{40} = 1.5.\) speed \(\times\) time \(= 55 \times 2 = 110.\) \(120 - 110 = 10\)

PTS: 3      REF: fall0734ia      STA: A.M.1      TOP: Speed

444 ANS:
\(-2, 3.\)
\[x^2 - x = 6\]
\[x^2 - x - 6 = 0\]
\[(x - 3)(x + 2) = 0\]
\[x = 3 \text{ or } -2\]

PTS: 3      REF: 011034ia      STA: A.A.28      TOP: Roots of Quadratics

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

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

Graph becomes wider as the coefficient approaches 0.

PTS: 3  REF: 061035ia  STA: A.G.5  TOP: Graphing Absolute Value Functions

447 ANS:

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

PTS: 3  REF: 081136ia  STA: A.N.3  TOP: Operations with Radicals

448 ANS:

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

449 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
The graph becomes steeper.

ANS: 

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

ANS: 

452 ANS: 

ANS: 

453 ANS: 

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

ANS: 

454 ANS: 

56. If the circumference of circle O is 16\pi\text{ inches}, the diameter, \overline{AD}, is 16\text{ inches} and the length of \overline{BC} is 12 inches \frac{3}{4} \times 16. The area of trapezoid \overline{ABCD} is \frac{1}{2} \times 4(12 + 16) = 56.
455 ANS:
0.65x + 35 \leq 45
0.65x \leq 10
x \leq 15

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

456 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

457 ANS:
\frac{38}{\pi}, 2. \ V = \pi r^2 h \quad \frac{36}{\frac{38}{\pi}} \approx 2.97. \text{ Three cans will not fit. The maximum number is 2.}
342 = \pi \left( \frac{6}{2} \right)^2 h
\frac{342}{9\pi} = h
\frac{38}{\pi} = h

PTS: 3 REF: 010936ia STA: A.G.2 TOP: Volume

458 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

459 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
They will not reach their goal in 18 months.

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

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

0.102. \( \frac{(5.3 \times 8.2 \times 4.1) - (5 \times 8 \times 4)}{5.3 \times 8.2 \times 4.1} = \frac{178.16 - 160}{178.16} = 0.102 \)

PTS: 3  REF: 011036ia  STA: A.M.3  TOP: Error

KEY: volume and surface area

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

KEY: frequency histograms
The turtle won by .5 minutes. Turtle: \( \frac{d}{s} = \frac{100}{20} = 5 \). Rabbit: \( \frac{d}{s} = \frac{100}{40} = 2.5 + 3 = 5.5 \)

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

466 ANS:
\[ 10 + 2d \geq 75, \quad 10 + 2d \geq 75 \]
\[ d \geq 32.5 \]

467 ANS:
\[ 60 - 42\sqrt{5} \cdot 3\sqrt{20/2} = 6\sqrt{100} - 21\sqrt{20} = 60 - 21\sqrt{4\sqrt{5}} = 60 - 42\sqrt{5} \]

468 ANS:
\[ \frac{1}{6}, \quad 16.67\%, \quad $13.50. \quad \frac{18 - 15}{18} = \frac{1}{6}, \quad 18 \times 0.75 = 13.5 \]
Integrated Algebra 4 Point Regents Exam Questions

Answer Section

469 ANS:
(H,F,M), (H,F,J), (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.

470 ANS:

PTS: 4 REF: 010939ia STA: A.S.19 TOP: Sample Space

471 ANS:

\[
\frac{x - 7}{3x} \cdot \frac{2x^2 - 8x - 42}{6x^2} = \frac{x^2 - 9}{x^2 - 3x} = \frac{2(x^2 - 4x - 21)}{6x^2} \cdot \frac{x(x - 3)}{(x + 3)(x - 3)} = \frac{(x - 7)(x + 3)}{3x} \cdot \frac{1}{x + 3} = \frac{x - 7}{3x}
\]

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

472 ANS:

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

473 ANS:

PTS: 4 REF: 080839ia STA: A.G.9 TOP: Quadratic-Linear Systems
473 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

474 ANS:
\[24,435.19 \cdot 30000(.95)^4 \approx 24435.19\]

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

475 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

476 ANS:

PTS: 4 REF: 010938ia STA: A.G.7 TOP: Systems of Linear Inequalities

477 ANS:

PTS: 4 REF: 081138ia STA: A.G.9 TOP: Quadratic-Linear Systems
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:  
\[ \frac{x^2 + 9x + 14}{x^2 - 49} + \frac{3x + 6}{x^2 + x - 56} = \frac{(x + 7)(x + 2)}{(x + 7)(x - 7)} \cdot \frac{(x + 8)(x - 7)}{3(x + 2)} = \frac{x + 8}{3} \]

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

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

\[ x \approx 39, \quad x \approx 63 \]

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

ANS:  
(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

ANS:  

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

![Box-and-Whisker Plot](image)

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

484 ANS:

7, 9, 11. \( x + (x + 2) + (x + 4) = 5(x + 2) - 18 \)

\[ 3x + 6 = 5x - 8 \]

\[ 14 = 2x \]

\[ 7 = x \]

PTS: 4 REF: 011237ia STA: A.A.6 TOP: Modeling Equations

485 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

486 ANS:


PTS: 4 REF: 061138ia STA: A.S.19 TOP: Sample Space

487 ANS:

315,000, 180,000, 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

488 ANS:

![System of Linear Inequalities](image)

PTS: 4 REF: 081037ia STA: A.G.7 TOP: Systems of Linear Inequalities
ANS: 

\[
\begin{align*}
4x + 3y & = 7 \\
12x + 9y & = 21 \\
3x + 2(5) & = 4
\end{align*}
\]

\[
\begin{align*}
y & = 5 \\
3x & = -6 \\
x & = -2
\end{align*}
\]
493 ANS:
\[-\frac{9}{4}: \quad \frac{3}{4} = \frac{-x + 11}{4x} + \frac{1}{2x} \]
\[\frac{3}{4} = \frac{-x - 11}{4x} + \frac{2}{4x} \]
\[\frac{3}{4} = \frac{-x - 9}{4x} \]
\[12x = -4x - 36 \]
\[16x = -36 \]
\[x = \frac{9}{4} \]

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

494 ANS:

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

495 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

496 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
497 ANS:
\[
\frac{m}{5} + \frac{3(m-1)}{2} = 2(m-3)
\]
\[
\frac{2m}{10} + \frac{15(m-1)}{10} = 2m - 6
\]
\[
\frac{17m - 15}{10} = 2m - 6
\]
\[17m - 15 = 20m - 60\]
\[45 = 3m\]
\[15 = m\]

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

498 ANS:

![Graph of quadratic-linear system]

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

499 ANS:

\[\begin{align*}
618.45, 613.44, 0.008. & \quad 21.7 \times 28.5 = 618.45. & \quad 21.6 \times 28.4 = 613.44. & \quad \left| \frac{618.45 - 613.44}{613.44} \right| \approx 0.008. \end{align*}\]

An error of less than 1% would seem to be insignificant.

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

KEY: area
500 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

501 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

502 ANS:

\[
\begin{array}{|c|c|c|}
\hline
\text{Interval} & \text{Tally} & \text{Frequency} \\
\hline
40-44 & [ & 1 \\
45-49 & [ & [ \\
50-54 & [ & [ \\
55-59 & [ & [ \\
60-64 & [ & [ \\
65-69 & & 2 \\
\hline
\end{array}
\]

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

503 ANS:

\[m = 50\epsilon, p = 15\epsilon. \quad 3m + 2p = 1.80 \quad 9m + 6p = 5.40. \quad 4(.50) + 6p = 2.90\]

\[4m + 6p = 2.90 \quad 4m + 6p = 2.90 \quad 6p = .90\]

\[5m = 2.50 \quad p = .015\]

\[m = .050\]

PTS: 3  REF: 080837ia  STA: A.A.7  TOP: Writing Linear Systems
6, 8, 10. Three consecutive even integers are \( x, x+2 \) and \( x+4 \). 
\[
(x + 2)(x + 4) = 10x + 20 \\
 x^2 + 6x + 8 = 10x + 20 \\
 x^2 - 4x - 12 = 0 \\
(x - 6)(x + 2) = 0 \\
 x = 6
\]

ANS: 6, 8, 10.

PTS: 4  REF: 011039ia  STA: A.A.8  TOP: Writing Quadratics


8, 3


PTS: 4  REF: 011238ia  STA: A.S.19  TOP: Sample Space

\[
\sin 50 = \frac{x}{110} \quad \cos 50 = \frac{y}{110} \\
x \approx 84 \quad y \approx 71
\]

ANS: \[
\sin 50 = \frac{x}{110} \quad \cos 50 = \frac{y}{110} \\
x \approx 84 \quad y \approx 71
\]

PTS: 4  REF: 081039ia  STA: A.A.44  TOP: Using Trigonometry to Find a Side