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

2. 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

3. ANS: 4
   REF: fall0704ia
   STA: A.A.29
   TOP: Set Theory

4. ANS: 3
   \( \frac{12x^3 - 6x^2 + 2x}{2x} = \frac{2x(6x^2 - 3x + 1)}{2x} = 6x^2 - 3x + 1 \)
   REF: 011011ia
   STA: A.A.14
   TOP: Rational Expressions

5. ANS: 3
   \( 3^2 + 5^2 = x^2 \)
   \( 34 = x^2 \)
   \( \sqrt{34} = x \)
   REF: 060909ia
   STA: A.A.45
   TOP: Pythagorean Theorem

6. 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

7. 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

8. ANS: 3
   \( 25 - 18 = 7 \)
   REF: 060822ia
   STA: A.S.9
   TOP: Frequency Histograms, Bar Graphs and Tables

9. ANS: 2
   \( x^2 + 5x + 6 = -x + 1. \quad y = -x + 1 \)
   \( x^2 + 6x + 5 = 0 \quad = -(5) + 1 \)
   \( (x + 5)(x + 1) = 0 \quad = 6 \)
   \( x = -5 \text{ or } -1 \)
   REF: 080812ia
   STA: A.A.11
   TOP: Quadratic-Linear Systems
If the car can travel 75 miles on 4 gallons, it can travel 300 miles on 16 gallons. \[
\frac{75}{4} = \frac{x}{16}.
\]
\[
x = 300
\]

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

\[15000(1.2)^2 = 21,600. \quad 21,600 - 15,000 = 6,600
\]

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

\[\begin{align*}
-4x + 2 & > 10 \\
-4x & > 8 \\
x & < -2
\end{align*}
\]
17 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

18 ANS: 2 REF: 080810ia STA: A.A.36 TOP: Parallel and Perpendicular Lines

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

20 ANS: 1

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

REF: 010928ia STA: A.S.23 TOP: Theoretical Probability
KEY: independent events

21 ANS: 1

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

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

22 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

23 ANS: 2

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

REF: 060925ia STA: A.A.10 TOP: Solving Linear Systems
24 ANS: 2
\[ s + o = 126. \ s + 2s = 126 \]
\[ o = 2s \quad s = 42 \]

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

25 ANS: 2
Debbie failed to distribute the 3 properly.

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

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

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

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

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

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

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

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

30 ANS: 2 REF: 011015ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph

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

REF: 081029ia STA: A.A.35 TOP: Writing Linear Equations
32. 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

33. 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

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

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

35. ANS: 3
   REF: fall0706ia STA: A.A.19 TOP: Factoring the Difference of Perfect Squares

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

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

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

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

39. ANS: 1
   REF: 060804ia STA: A.A.19 TOP: Factoring the Difference of Perfect Squares

40. ANS: 2
   \[\frac{2}{5x - \frac{3x}{x^2}} = \frac{18x - 10x}{15x^2} = \frac{8x}{15x^2} = \frac{8}{15x}\]

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

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

42. ANS: 2
   \[\frac{2x^2 - 12x}{x - 6} = \frac{2x(x - 6)}{x - 6} = 2x\]

   REF: 060824ia STA: A.A.14 TOP: Rational Expressions

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

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

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

ANS: 2
\[1.5^3 = 3.375\]

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

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

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

ANS: 1 REF: fall0728ia STA: A.A.15 TOP: Undefined Rationals

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

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

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

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

ANS: 3 REF: fall0710ia STA: A.A.31 TOP: Set Theory

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

ANS: 4

REF: 080822ia STA: A.S.8 TOP: Scatter Plots
54 ANS: 4 REF: 060927ia STA: A.N.4 TOP: Operations with Scientific Notation

55 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

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

57 ANS: 3

\[ x^2 - 9 = 0 \]
\[ (x + 3)(x - 3) = 0 \]
\[ x = \pm 3 \]

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

58 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

59 ANS: 1

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

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

60 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

61 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

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

63 ANS: 3

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

REF: fall0716ia STA: A.A.33 TOP: Slope
64 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

65 ANS: 2
\[
x^2 - x - 20 = 3x - 15 \quad y = 3x - 15
\]
\[
x^2 - 4x - 6 = 0 \quad = 3(-1) - 15
\]
\[
(x = 5)(x + 1) = 0 \quad = -18
\]
\[
x = 5 \text{ or } -1
\]

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

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

67 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.14 TOP: Rational Expressions

68 ANS: 4
\[
6\sqrt{50} + 6\sqrt{2} = 6\sqrt{25\cdot2} + 6\sqrt{2} = 30\sqrt{2} + 6\sqrt{2} = 36\sqrt{2}
\]

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

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

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

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

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

71 ANS: 2 REF: 061027ia STA: A.A.20 TOP: Factoring Polynomials

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

73 ANS: 3 REF: 081009ia STA: A.A.30 TOP: Set Theory

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

75 ANS: 4 REF: 061016ia STA: A.A.2 TOP: Expressions
76 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

77 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

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

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

79 ANS: 3 REF: 060924ia STA: A.G.8 TOP: Solving Quadratics by Graphing
80 ANS: 2 REF: 080901ia STA: A.A.4 TOP: Modeling Equations

81 ANS: 1
\[
\frac{2}{x} - 3 = \frac{26}{x}
\]
\[
-3 = \frac{24}{x}
\]
\[
x = -8
\]

REF: 010918ia STA: A.A.25 TOP: Solving Rationals

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

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

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

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

84 ANS: 4 REF: 010927ia STA: A.N.4 TOP: Operations with Scientific Notation
85 ANS: 4 REF: 011025ia STA: A.A.17 TOP: Addition and Subtraction of Rationals
86 ANS: 1 REF: 060811ia STA: A.G.10 TOP: Identifying the Vertex of a Quadratic Given Graph
Let \( x \) = youngest brother and \( x + 4 \) = oldest brother. \( 3x - (x + 4) = 48 \).

\[
2x - 4 = 48
\]

\[
x = 26
\]

ANS: 4

87 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

88 ANS: 3

KEY: mutually exclusive events

89 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

90 ANS: 2

TOP: Identifying the Vertex of a Quadratic Given Graph

91 ANS: 2

\[
L + S = 47
\]

\[
L - S = 15
\]

\[
2L = 62
\]

\[
L = 31
\]

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

92 ANS: 3

\[
\sum P_4 = 360
\]

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

93 ANS: 4

16^2 + b^2 = 34^2

\[
b^2 = 900
\]

\[
b = 30
\]

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

94 ANS: 4

\[
y = mx + b
\]

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

\[
b = -7
\]

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

95 ANS: 1

REF: 011001ia STA: A.S.6 TOP: Box-and-Whisker Plots
96 ANS: 1
\[ m = \frac{4 - (-4)}{-5 - 15} = \frac{2}{5} \]

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

97 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

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

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

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

101 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

102 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

103 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

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

105 ANS: 2
The slope of the inequality is \( \frac{1}{2} \).

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

106 ANS: 4
REF: 060829ia STA: A.G.5 TOP: Graphing Quadratic Functions

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

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

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

109 ANS: 4
REF: 061001ia STA: A.A.30 TOP: Set Theory
ANS: 2  REF: 081003ia  STA: A.A.31  TOP: Set Theory
500(1 + 0.06)^3 ≈ 596

ANS: 3  REF: 080929ia  STA: A.A.9  TOP: Exponential Functions
\[
\frac{2+3+0+1+3+2+4+0+2+3}{10} = \frac{20}{10} = 2 \quad \frac{x}{10} = 2 + 0.5
\]
\[x = 25\]

ANS: 4  REF: 081020ia  STA: A.S.16  TOP: Average Known with Missing Data

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

ANS: 1  REF: 080828ia  STA: A.M.3  TOP: Error

ANS: 3  REF: 011013ia  STA: A.A.35  TOP: Writing Linear Equations
\[m = \frac{7-3}{-3-3} = \frac{4}{-6} = -\frac{2}{3} \quad y = mx + b \]
\[3 = \frac{2}{3}(3) + b \]
\[3 = -2 + b \]
\[5 = b \]

ANS: 3  REF: 080923ia  STA: A.N.6  TOP: Evaluating Expressions
\[|-5(5) + 12| = |-13| = 13\]
\[
\frac{x + 2}{x - 2} = \frac{-3}{x}
\]
\[x(x + 2) = -3(x - 2)
\]
\[x^2 + 2x = -3x + 6
\]
\[x^2 + 5x - 6 = 0
\]
\[(x + 6)(x - 1) = 0
\]
\[x = -6 \text{ or } 1
\]

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

119 ANS: 3
5x + 2y = 48
3x + 2y = 32
2x = 16
x = 8

REF: fall0708ia STA: A.A.7 TOP: Writing Linear Systems

120 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

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

122 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

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

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

124 ANS: 4
REF: 010908ia STA: A.A.9 TOP: Exponential Functions
125 ANS: 1  REF: 081015ia  STA: A.G.5  TOP: Graphing Quadratic Functions
126 ANS: 4  
\[ A = \{2, 4, 6, 8, 10, 12, 14, 16, 18, 20\} \]

REF: 080912ia  STA: A.A.30  TOP: Set Theory
127 ANS: 4  
\[ SA = 2hlw + 2hlw + 2lh = 2(2)(3) + 2(4)(3) + 2(2)(4) = 52 \]

REF: 011029ia  STA: A.G.2  TOP: Surface Area
128 ANS: 4  
\[ s = \frac{d}{t} = \frac{150 \text{ m}}{1.5 \text{ min}} \times \frac{60 \text{ min}}{1 \text{ hr}} = 6,000 \frac{\text{ m}}{\text{ hr}} \]

REF: 061025ia  STA: A.M.1  TOP: Speed
129 ANS: 3  
\[ \frac{15}{15 + 13 + 12} = \frac{15}{40} = \frac{3}{8} \]

REF: 061006ia  STA: A.S.21  TOP: Experimental Probability
130 ANS: 4  
\[ \frac{5}{45} = \frac{8}{x} \]
\[ 5x = 360 \]
\[ x = 72 \]

REF: 060901ia  STA: A.M.1  TOP: Speed
131 ANS: 2  REF: 010909ia  STA: A.A.19  TOP: Factoring the Difference of Perfect Squares
132 ANS: 3  
\[ \frac{2 + x}{5x} \times \frac{x - 2}{5x} = \frac{2 + x - x + 2}{5x} = \frac{4}{5x} \]

REF: 081027ia  STA: A.A.17  TOP: Addition and Subtraction of Rationals
133 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
134 ANS: 2  REF: 080930ia  STA: A.S.17  TOP: Scatter Plots
5p - 1 = 2p + 20

3p = 21

p = 7

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

3c + 4m = 12.50

3c + 2m = 8.50

2m = 4.00

m = 2.00

REF: 060806ia STA: A.A.7 TOP: Writing Linear Systems

2

\[ \frac{149.6 - 174.2}{149.6} \approx 0.1644 \]

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

so = f + 60  \quad j = 2f - 50  \quad se = 3f  \quad f + (f + 60) + (2f - 50) + 3f = 1424

7f + 10 = 1424

f = 202

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

3

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

The transformation is a reflection in the x-axis.

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

ANS: 1

\[ so = f + 60  \quad j = 2f - 50  \quad se = 3f  \quad f + (f + 60) + (2f - 50) + 3f = 1424 \]

\[ 7f + 10 = 1424 \]

\[ f = 202 \]

REF: 060917ia STA: A.A.7 TOP: Writing Linear Systems
146 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

147 ANS: 1

$x = \frac{-b}{2a} = \frac{-(-16)}{2(1)} = 8$. $y = (8)^2 - 16(8) + 63 = -1$

REF: 060918ia STA: A.A.41 TOP: Identifying the Vertex of a Quadratic Given Equation

148 ANS: 3

REF: 081008ia STA: A.A.19

TOP: Factoring the Difference of Perfect Squares

149 ANS: 1

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

150 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

151 ANS: 4

$\frac{\text{distance}}{\text{time}} = \frac{24}{6} = 4$

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

152 ANS: 1

$\frac{\sqrt{32}}{4} = \frac{\sqrt{16} \sqrt{2}}{4} = \sqrt{2}$

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

153 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

154 ANS: 1

$-|a - b| = -|7 - (-3)| = -|-10| = -10$

REF: 011010ia STA: A.N.6 TOP: Evaluating Expressions
155 ANS: 2
\[ R = 0.5^{d-1} \]

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

156 ANS: 4
\[ \frac{2^6}{2^1} = 2^5 \]

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

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

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

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

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

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

160 ANS: 2
\[ P = 2l + 2w \]
\[ P - 2l = 2w \]
\[ \frac{P - 2l}{2} = w \]

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

161 ANS: 3 REF: 080907ia STA: A.S.20 TOP: Theoretical Probability

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

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

163 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
164 ANS: 4  
$25(x - 3) = 25x - 75$

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

165 ANS: 2  REF: 080823ia STA: A.A.32 TOP: Slope

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

KEY: addition

167 ANS: 2  
$m = \frac{5 - 3}{2 - 7} = \frac{2}{5}$

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

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

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

170 ANS: 4  
$x^2 - 7x + 6 = 0$

$(x - 6)(x - 1) = 0$

$x = 6, x = 1$

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

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

172 ANS: 2  
$\left| \frac{55.42 - 50.27}{55.42} \right| = 0.093$

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

173 ANS: 4  
$\frac{9.2 \times 10^6}{2.3 \times 10^2} = 4 \times 10^4$

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

174 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

175 ANS: 4  REF: 080903ia STA: A.A.12 TOP: Multiplication of Powers

176 ANS: 2  
$\tan B = \frac{\text{opposite}}{\text{adjacent}} = \frac{8}{15} = 0.53$

REF: 081026ia STA: A.A.42 TOP: Trigonometric Ratios
\[ \frac{5}{x} = \frac{x + 13}{6} \]

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

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

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

\[ x = -15 \text{ or } 2 \]

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

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

KEY: subtraction

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

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

ANS: 1  REF: 061020ia  STA: A.A.8  TOP: Writing Quadratics

\[ x^2 - 36 = 5x \]

\[ x^2 - 5x - 36 = 0 \]

\[ (x - 9)(x + 4) = 0 \]

\[ x = 9 \]

REF: 061020ia  STA: A.A.8  TOP: Writing Quadratics

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

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

ANS: 2  

\[ \sin A = \frac{8}{12} \]

\[ A \approx 42 \]

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

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

ANS: 4  

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

REF: 060815ia  STA: A.A.18  TOP: Multiplication and Division of Rationals
186 ANS: 3
\[(3 - 1) \times 2 \times 3 = 12\]

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

187 ANS: 3
\[35000(1 - 0.05)^4 \approx 28507.72\]

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

188 ANS: 3
\[
\cos A = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{15}{17}
\]

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

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

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

190 ANS: 4
\[sP_3 = 336\]

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

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

192 ANS: 2
\[\frac{2x - 3}{x - 4} = \frac{2}{3}\]
\[3(2x - 3) = 2(x - 4)\]
\[6x - 9 = 2x - 8\]
\[4x = 1\]
\[x = \frac{1}{4}\]

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

193 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

194 ANS: 4 REF: 011016ia STA: A.A.23 TOP: Transforming Formulas
195 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

196 ANS: 2

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

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

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

198 ANS: 2

REF: 060904ia STA: A.A.1 TOP: Expressions

199 ANS: 2
The volume of the cube using Ezra’s measurements is \( 8 (2^3) \). 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

200 ANS: 3
\[ F = \frac{9}{5} C + 32 = \frac{9}{5} (15) + 32 = 59 \]

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

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

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

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

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

KEY: independent events
203 ANS: 3  REF: 060817ia  STA: A.A.15  TOP: Undefined Rationals

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

205 ANS: 3
\( x^2 - 6x = 0 \)
\( x(x - 6) = 0 \)
\( x = 0 \)  \( x = 6 \)

206 ANS: 1

\[
\frac{(2x \times 6) + (3 \times x)}{3 \times 6} = 5
\]
\[
\frac{12x + 3x}{18} = 5
\]
\( 15x = 90 \)
\( x = 6 \)

207 ANS: 1  REF: 080803ia  STA: A.A.4  TOP: Modeling Inequalities

208 ANS: 3
\( x = \frac{-b}{2a} = \frac{-10}{2(-1)} = 5 \).

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

210 ANS: 3  REF: 081001ia  STA: A.S.7  TOP: Scatter Plots

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

212 ANS: 2  REF: 060830ia  STA: A.A.9  TOP: Exponential Functions
Candidate $B$ received 45%. $45\% \times 1860 = 837$

$P_4 = 4 \times 3 \times 2 \times 1 = 24$

$SA = 2hw + 2hw + 2lh = 2(3)(1.5) + 2(2)(1.5) + 2(3)(2) = 27$

$2(x - 3y = -3)$
$2x + y = 8$
$2x - 6y = -6$
$7y = 14$
$y = 2$
Integrated Algebra Multiple Choice Regents Exam Questions
Answer Section

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

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

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

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

222 ANS: 1
\(-2x + 5 > 17\)
\(-2x > 12\)
\(x < -6\)

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

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

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

225 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: Theoretical Probability

226 ANS: 1
To determine student interest, survey the widest range of students.

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

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

228 ANS: 4
\(x^2 - 2 = x\)  Since \(y = x\), the solutions are \((2, 2)\) and \((-1, -1)\).

\(x^2 - x - 2 = 0\)

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

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

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

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

REF: 060814ia STA: A.A.38 TOP: Parallel and Perpendicular Lines
The other situations are quantitative.

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

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

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

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

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

234 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

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

236 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

237 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

238 ANS: 4
REF: 010929ia STA: A.S.6 TOP: Box-and-Whisker Plots

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

240 ANS: 3
The other situations are quantitative.

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

241 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

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

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

244 ANS: 4
REF: 060930ia STA: A.A.29 TOP: Set Theory
The number of correct answers on a test causes the test score.

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

−2(x − 5) < 4
−2x + 10 < 4
−2x < −6
x > 3

An element of the domain, 1, is paired with two different elements of the range, 3 and 7.

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

The slope of \(2x - 4y = 16\) is \(-\frac{2}{-4} = \frac{1}{2}\)
The age of a child does not cause the number of siblings he has, or vice versa.

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

\[2x - 3y = 9\]
\[2(0) - 3(-3) = 9\]
\[0 + 9 = 9\]
Integrated Algebra 2 Point Regents Exam Questions

Answer Section

271 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

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

PTS: 2 REF: 081031ia STA: A.A.14 TOP: Rational Expressions

273 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

274 ANS: 
\( 30\sqrt{2} \). 5\( \sqrt{72} = 5\sqrt{36 \cdot 2} = 30\sqrt{2} \)

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

275 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

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

PTS: 2 REF: 080833ia STA: A.A.30 TOP: Set Theory

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

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

278 ANS: 
\[
\sin x = \frac{30}{50} = \frac{3}{5} \\
x = \sin^{-1} \frac{3}{5} \\
x \approx 37
\]

PTS: 2 REF: 061033ia STA: A.A.43 TOP: Using Trigonometry to Find an Angle
279 ANS: 
\[
111.25. \quad \frac{\text{distance}}{\text{time}} = \frac{89}{0.8} = 111.25
\]

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

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

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

281 ANS: 
\[-3\sqrt{48} = -3\sqrt{16 \times 3} = -12\sqrt{3}\]

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

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

PTS: 2 \quad REF: 080932ia \quad STA: A.G.2 \quad TOP: Volume

283 ANS: 
\[-6a + 42. \text{ distributive}\]

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

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

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

285 ANS: 
Not all of the homework problems are equations. The first problem is an expression.

PTS: 2 \quad REF: 080931ia \quad STA: A.A.3 \quad TOP: Expressions

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

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

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

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

288 ANS: 
60. \(3P_3 = 60\)

PTS: 2 \quad REF: 060931ia \quad STA: A.N.8 \quad TOP: Permutations
4. \(3 + 2g = 5g - 9\)
   \[12 = 3g\]
   \[g = 4\]

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

290 ANS:
   \(4x(x + 3)(x - 3)\).
   \(4x^3 - 36x = 4x(x^2 - 9) = 4x(x + 3)(x - 3)\)

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

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: Theoretical Probability
   KEY: independent events

292 ANS:
   Ann’s. \(\frac{225}{15} = 15\) mpg is greater than \(\frac{290}{23.2} = 12.5\) mpg

PTS: 2  REF: 060831ia  STA: A.M.1  TOP: Using Rate

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

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

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

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

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

PTS: 2  REF: 011032ia  STA: A.A.43  TOP: Using Trigonometry to Find an Angle
\[
\begin{align*}
2,160 \frac{1,200}{25} &= \frac{x}{45} \\
25x &= 54,000 \\
x &= 2,160
\end{align*}
\]

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

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
Integrated Algebra 3 Point Regents Exam Questions
Answer Section

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

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

299 ANS:
81.3, 80, both increase

PTS: 3          REF: 011035ia  STA: A.S.16  TOP: Central Tendency

300 ANS:
1,512, 1,551.25, 0.025. \(3 \times 42 = 1512.\)
\(36.5 \times 42.5 = 1551.25.\)
\(RE = \left| \frac{1512 - 1551.25}{1551.25} \right| \approx 0.025.\)

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

301 ANS:
\[
\frac{3}{4x-8} + \frac{3x+6}{4x+12} = \frac{x^2-4}{x+3} \cdot \frac{3(x+2)}{4(x+3)} \cdot \frac{x+3}{(x+2)(x-2)} = \frac{3}{4(x-2)}
\]

PTS: 3          REF: 010934ia  STA: A.A.18  TOP: Multiplication and Division of Rationals

302 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

303 ANS:
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

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

PTS: 3          REF: 010936ia  STA: A.G.2  TOP: Volume
305 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

306 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

307 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

308 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

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

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

![Graph of Donut Pit Profits]

They will not reach their goal in 18 months.

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

311 ANS:

![Graph of Scatter Plots]

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

312 ANS:

\[ \frac{\text{distance}}{\text{time}} = \frac{60}{1.2} = 50. \quad \frac{\text{distance}}{\text{time}} = \frac{60}{40} = 1.5. \quad \text{speed} \times \text{time} = 55 \times 2 = 110. \quad 120 - 110 = 10 \]

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

313 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

314 ANS:

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

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

315 ANS:

\[ 60 - 42\sqrt{5}. \quad 3\sqrt{20}(2\sqrt{5} - 7) = 6\sqrt{100} - 21\sqrt{20} = 60 - 21\sqrt{4}\sqrt{5} = 60 - 42\sqrt{5} \]

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

KEY: multiplication
316 ANS:

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

\[ 4 = \frac{2}{5}(5) + b \]

\[ b = 2 \]

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

317 ANS:

. 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

318 ANS:

. Graph becomes wider as the coefficient approaches 0.

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

319 ANS:

\[ -15, 2 \quad x^2 + 13x - 30 = 0 \]

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

\[ x = -15, 2 \]

PTS: 3  REF: 081036ia  STA: A.A.28  TOP: Roots of Quadratics
ANS:
\[
\begin{align*}
  x &= \frac{-b}{2a} = \frac{-(-8)}{2(-2)} = -2 \\
  y &= \frac{-2(-2)^2 - 8(-2) + 3}{-4} = 11
\end{align*}
\]

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 $\frac{1}{2} \times 4(12 + 16) = 56$.

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

ANS:
\[
\frac{1}{6}, 16.67\%, $13.50. \quad \frac{18 - 15}{18} = \frac{1}{6}, \quad 18 \times 0.75 = 13.5
\]

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

ANS:
\[
5,583.86. \quad A = P(1 + R)^t = 5000(1 + 0.0375)^3 \approx 5583.86
\]

PTS: 3  REF: 060935ia  STA: A.A.9  TOP: Exponential Functions
Integrated Algebra 4 Point Regents Exam Questions
Answer Section

325 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.

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

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

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

327 ANS:
\[
\begin{align*}
6, -2. \\
\frac{x + 1}{x} &= \frac{-7}{x - 12} \\
(x + 1)(x - 12) &= -7x \\
x^2 - 11x - 12 &= -7x \\
x^2 - 4x - 12 &= 0 \\
(x - 6)(x + 2) &= 0 \\
x &= 6 \text{ or } -2
\end{align*}
\]

PTS: 4 REF: fall0739ia STA: A.A.26 TOP: Solving Rationals

328 ANS:
\((−2, 5). \quad 3x + 2y = 4 \quad 12x + 8y = 16. \quad 3x + 2y = 4 \\
4x + 3y = 7 \quad 12x + 9y = 21 \quad 3x + 2(5) = 4 \\
y = 5 \quad 3x = -6 \\
x = -2
\]

PTS: 4 REF: 010937ia STA: A.A.10 TOP: Solving Linear Systems

329 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

1
330 ANS:

\[
\begin{array}{c}
\begin{array}{|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline
65 & 70 & 75 & 80 & 85 & 90 & 95 & 100 \\
\hline
\end{array}
\end{array}
\]

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

331 ANS:

\[
\begin{align*}
84, 71 & \quad \sin 50 = \frac{x}{110} \\
& \quad \cos 50 = \frac{y}{110} \\
& \quad x \approx 84 \\
& \quad y \approx 71
\end{align*}
\]

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

332 ANS:

\[
\begin{align*}
15,600,000, 4,368,000. & \quad 10 \times 10 \times 10 \times 26 \times 25 \times 24 = 15,600,000. \\
& \quad 10 \times 9 \times 26 \times 25 \times 24 = 11,232,000. \\
& \quad 15,600,000 - 11,232,000 = 4,368,000.
\end{align*}
\]

PTS: 4  REF: 011037ia  STA: A.N.8  TOP: Permutations

333 ANS:

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

PTS: 4  REF: 060837ia  STA: A.A.8  TOP: Geometric Applications of Quadratics

334 ANS:

\[
\begin{align*}
39, 63. & \quad \tan 52 = \frac{50}{x} \\
& \quad \sin 52 = \frac{50}{x} \\
& \quad x \approx 39 \\
& \quad x \approx 63
\end{align*}
\]

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

335 ANS:

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

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

336 ANS:

\[
\begin{align*}
\frac{x^2 + 9x + 14}{x^2 - 49} & + \frac{3x + 6}{x^2 + x - 56} = \frac{(x + 7)(x + 2)}{(x + 7)(x - 7)} + \frac{(x + 8)(x - 7)}{3(x + 2)} = \frac{x + 8}{3}
\end{align*}
\]

PTS: 4  REF: 061037ia  STA: A.A.18  TOP: Multiplication and Division of Rationals
337 ANS:
6, 8, 10. Three consecutive even integers are \(x\), \(x+2\) and \(x+4\). \((x+2)(x+4) = 10x + 20\)
\[x^2 + 6x + 8 = 10x + 20\]
\[x^2 - 4x - 12 = 0\]
\((x-6)(x+2) = 0\)
\[x = 6\]

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

339 ANS:

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

![Graph 1](image1)

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

341 ANS:

**PTS:** 4  **REF:** 080838ia  **STA:** A.S.5  **TOP:** Frequency Histograms, Bar Graphs and Tables

<table>
<thead>
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<th>Interval</th>
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<tbody>
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<td>2–3</td>
<td>1111</td>
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<tr>
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<td>0–5</td>
<td>17</td>
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<tr>
<td>0–7</td>
<td>20</td>
</tr>
</tbody>
</table>

![Histogram and Table 2](image2)

342 ANS:

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

![Graph showing a parabola with points (-3, 0), (2, 0)].

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

344 ANS:

![Graph showing two intersecting lines with points (-3, 0)].

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

345 ANS:

![Frequency histogram with intervals and corresponding frequency counts].

PTS: 4  REF: 060938ia  STA: A.S.5  TOP: Frequency Histograms, Bar Graphs and Tables
346. ANS:

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

348. ANS:

349. ANS:
315,000, 180,000, the median better represents value since it is closer to more prices than the mean.

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