

JEFFERSON MATH PROJECT

REGENTS BY TYPE

The NY Algebra 2/Trigonometry Regents Exams
Fall 2009-June 2011
(Answer Key)

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Dear Sir

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

Letter from Thomas Jefferson to William G. Munford, Monticello, June 18, 1799.

Algebra 2/Trigonometry Multiple Choice Regents Exam Questions Answer Section

1 ANS: 2

$$f^{-1}(x) = \log_4 x$$

PTS: 2 REF: fall0916a2 STA: A2.A.54 TOP: Graphing Logarithmic Functions

2 ANS: 4

$$9^{3x+1} = 27^{x+2}$$

$$(3^2)^{3x+1} = (3^3)^{x+2}$$

$$3^{6x+2} = 3^{3x+6}$$

$$6x+2 = 3x+6$$

$$3x = 4$$

$$x = \frac{4}{3}$$

PTS: 2 REF: 081008a2 STA: A2.A.27 TOP: Exponential Equations

KEY: common base not shown

3 ANS: 3

$$b^2 - 4ac = (-10)^2 - 4(1)(25) = 100 - 100 = 0$$

PTS: 2 REF: 011102a2 STA: A2.A.2 TOP: Using the Discriminant

KEY: determine nature of roots given equation

4 ANS: 4

$$6x - x^3 - x^2 = -x(x^2 + x - 6) = -x(x+3)(x-2)$$

PTS: 2 REF: fall0917a2 STA: A2.A.7 TOP: Factoring Polynomials

KEY: single variable

5 ANS: 4 PTS: 2 REF: 011124a2 STA: A2.A.18

TOP: Evaluating Logarithmic Expressions

6 ANS: 1 PTS: 2 REF: 061004a2 STA: A2.A.52

TOP: Identifying the Equation of a Graph

7 ANS: 1

$$\sqrt[4]{16x^2y^7} = 16^{\frac{1}{4}} x^{\frac{2}{4}} y^{\frac{7}{4}} = 2x^{\frac{1}{2}} y^{\frac{7}{4}}$$

PTS: 2 REF: 061107a2 STA: A2.A.11 TOP: Radicals as Fractional Exponents

8 ANS: 2

$$K = \frac{1}{2}(10)(18) \sin 120 = 45\sqrt{3} \approx 78$$

PTS: 2 REF: fall0907a2 STA: A2.A.74 TOP: Using Trigonometry to Find Area

KEY: basic

9 ANS: 2

$$x^2 - 2x + y^2 + 6y = -3$$

$$x^2 - 2x + 1 + y^2 + 6y + 9 = -3 + 1 + 9$$

$$(x-1)^2 + (y+3)^2 = 7$$

PTS: 2

REF: 061016a2

STA: A2.A.47

TOP: Equations of Circles

10 ANS: 1

$$y \geq x^2 - x - 6$$

$$y \geq (x-3)(x+2)$$

PTS: 2

REF: 061017a2

STA: A2.A.4

TOP: Quadratic Inequalities

KEY: two variables

11 ANS: 4

PTS: 2

REF: 061101a2

STA: A2.S.1

TOP: Analysis of Data

12 ANS: 4

$$4ab\sqrt{2b} - 3a\sqrt{9b^2} \sqrt{2b} + 7ab\sqrt{6b} = 4ab\sqrt{2b} - 9ab\sqrt{2b} + 7ab\sqrt{6b} = -5ab\sqrt{2b} + 7ab\sqrt{6b}$$

PTS: 2

REF: fall0918a2

STA: A2.A.14

TOP: Operations with Radicals

KEY: with variables | index = 2

13 ANS: 3

PTS: 2

REF: fall0910a2

STA: A2.A.76

TOP: Angle Sum and Difference Identities

KEY: simplifying

14 ANS: 1

$$-420 \left(\frac{\pi}{180} \right) = -\frac{7\pi}{3}$$

PTS: 2

REF: 081002a2

STA: A2.M.2

TOP: Radian Measure

KEY: radians

15 ANS: 2

PTS: 2

REF: fall0926a2

STA: A2.A.46

TOP: Transformations with Functions and Relations

16 ANS: 3

$$75000 = 25000e^{.0475t}$$

$$3 = e^{.0475t}$$

$$\ln 3 = \ln e^{.0475t}$$

$$\frac{\ln 3}{.0475} = \frac{.0475t \cdot \ln e}{.0475}$$

$$23.1 \approx t$$

PTS: 2

REF: 061117a2

STA: A2.A.6

TOP: Exponential Growth

17 ANS: 4

PTS: 2

REF: fall0925a2

STA: A2.S.10

TOP: Permutations

18 ANS: 4

$$S_n = \frac{n}{2} [2a + (n-1)d] = \frac{21}{2} [2(18) + (21-1)2] = 798$$

PTS: 2 REF: 061103a2 STA: A2.A.35 TOP: Summations
KEY: arithmetic

19 ANS: 1

$$\frac{\sqrt{3}+5}{\sqrt{3}-5} \cdot \frac{\sqrt{3}+5}{\sqrt{3}+5} = \frac{3+5\sqrt{3}+5\sqrt{3}+25}{3-25} = \frac{28+10\sqrt{3}}{-22} = -\frac{14+5\sqrt{3}}{11}$$

PTS: 2 REF: 061012a2 STA: A2.N.5 TOP: Rationalizing Denominators

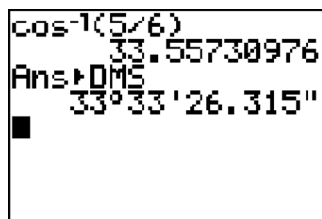
20 ANS: 3

n	0	1	2	Σ
$n^2 + 2^n$	$0^2 + 2^0 = 1$	$1^2 + 2^1 = 3$	$2^2 + 2^2 = 8$	12

$$2 \times 12 = 24$$

PTS: 2 REF: fall0911a2 STA: A2.N.10 TOP: Sigma Notation
KEY: basic

21 ANS: 1



$$\cos K = \frac{5}{6}$$

$$K = \cos^{-1} \frac{5}{6}$$

$$K \approx 33^\circ 33'$$

PTS: 2 REF: 061023a2 STA: A2.A.55 TOP: Trigonometric Ratios

22 ANS: 3

Cofunctions tangent and cotangent are complementary

PTS: 2 REF: 061014a2 STA: A2.A.58 TOP: Cofunction Trigonometric Relationships

23 ANS: 2

$$f(10) = \frac{-10}{(-10)^2 - 16} = \frac{-10}{84} = -\frac{5}{42}$$

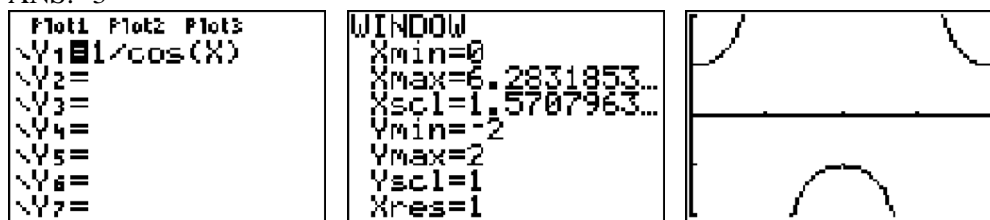
PTS: 2 REF: 061102a2 STA: A2.A.41 TOP: Functional Notation

24 ANS: 2

$$\cos(-305^\circ + 360^\circ) = \cos(55^\circ)$$

PTS: 2 REF: 061104a2 STA: A2.A.57 TOP: Reference Angles

25 ANS: 3



PTS: 2 REF: 061020a2 STA: A2.A.71 TOP: Graphing Trigonometric Functions

26 ANS: 1 PTS: 2 REF: 061018a2 STA: A2.A.22

TOP: Solving Radicals KEY: extraneous solutions

27 ANS: 2

$$(3 - 7i)(3 - 7i) = 9 - 21i - 21i + 49i^2 = 9 - 42i - 49 = -40 - 42i$$

PTS: 2 REF: fall0901a2 STA: A2.N.9

TOP: Multiplication and Division of Complex Numbers

28 ANS: 1

common difference is 2. $b_n = x + 2n$

$$10 = x + 2(1)$$

$$8 = x$$

PTS: 2 REF: 081014a2 STA: A2.A.29 TOP: Sequences

29 ANS: 4

$$\frac{2\pi}{b} = \frac{2\pi}{\frac{1}{3}} = 6\pi$$

PTS: 2 REF: 061027a2 STA: A2.A.69

TOP: Properties of Graphs of Trigonometric Functions

KEY: period

30 ANS: 3

$$\frac{3}{\sqrt{3a^2b}} = \frac{3}{a\sqrt{3b}} \cdot \frac{\sqrt{3b}}{\sqrt{3b}} = \frac{3\sqrt{3b}}{3ab} = \frac{\sqrt{3b}}{ab}$$

PTS: 2 REF: 081019a2 STA: A2.A.15 TOP: Rationalizing Denominators

KEY: index = 2

31 ANS: 2

The roots are $-1, 2, 3$.

PTS: 2 REF: 081023a2 STA: A2.A.50 TOP: Solving Polynomial Equations

32 ANS: 3

$$\left(\frac{2}{3}\right)^2 + \cos^2 A = 1 \quad \sin 2A = 2 \sin A \cos A$$

$$\cos^2 A = \frac{5}{9} \quad = 2\left(\frac{2}{3}\right)\left(\frac{\sqrt{5}}{3}\right)$$

$$\cos A = +\frac{\sqrt{5}}{3}, \sin A \text{ is acute.} \quad = \frac{4\sqrt{5}}{9}$$

PTS: 2 REF: 011107a2 STA: A2.A.77 TOP: Double Angle Identities

KEY: evaluating

33 ANS: 1 PTS: 2 REF: 061013a2 STA: A2.A.38

TOP: Defining Functions

34 ANS: 2

$$8^2 = 64$$

PTS: 2 REF: fall0909a2 STA: A2.A.18 TOP: Evaluating Logarithmic Expressions

35 ANS: 1

$8 \times 8 \times 7 \times 1 = 448$. The first digit cannot be 0 or 5. The second digit cannot be 5 or the same as the first digit. The third digit cannot be 5 or the same as the first or second digit.

PTS: 2 REF: 011125a2 STA: A2.S.10 TOP: Permutations

36 ANS: 3

$$S = \frac{-b}{a} = \frac{-(-3)}{4} = \frac{3}{4}, P = \frac{c}{a} = \frac{-8}{4} = -2$$

PTS: 2 REF: fall0912a2 STA: A2.A.21 TOP: Roots of Quadratics

KEY: basic

37 ANS: 3 PTS: 2 REF: 011119a2 STA: A2.A.52

TOP: Families of Functions

38 ANS: 3

$$\text{period} = \frac{2\pi}{b} = \frac{2\pi}{3\pi} = \frac{2}{3}$$

PTS: 2 REF: 081026a2 STA: A2.A.70 TOP: Graphing Trigonometric Functions

KEY: recognize

39 ANS: 3

(1) and (4) fail the horizontal line test and are not one-to-one. Not every element of the range corresponds to only one element of the domain. (2) fails the vertical line test and is not a function. Not every element of the domain corresponds to only one element of the range.

PTS: 2 REF: 081020a2 STA: A2.A.43 TOP: Defining Functions

40 ANS: 4 PTS: 2 REF: fall0908a2 STA: A2.A.38

TOP: Defining Functions KEY: graphs

41 ANS: 4

$$b^2 - 4ac = 3^2 - 4(9)(-4) = 9 + 144 = 153$$

PTS: 2 REF: 081016a2 STA: A2.A.2 TOP: Using the Discriminant
KEY: determine nature of roots given equation

42 ANS: 3 PTS: 2 REF: 061007a2 STA: A2.S.9

TOP: Differentiating Permutations and Combinations

43 ANS: 2

$$\left(\frac{w^{-5}}{w^{-9}} \right)^{\frac{1}{2}} = (w^4)^{\frac{1}{2}} = w^2$$

PTS: 2 REF: 081011a2 STA: A2.A.8 TOP: Negative and Fractional Exponents

44 ANS: 3

$$3x + 16 = (x + 2)^2 \quad . \quad -4 \text{ is an extraneous solution.}$$

$$3x + 16 = x^2 + 4x + 4$$

$$0 = x^2 + x - 12$$

$$0 = (x + 4)(x - 3)$$

$$x = -4 \quad x = 3$$

PTS: 2 REF: 061121a2 STA: A2.A.22 TOP: Solving Radicals
KEY: extraneous solutions

45 ANS: 3 PTS: 2 REF: 011104a2 STA: A2.A.64
TOP: Using Inverse Trigonometric Functions KEY: unit circle

46 ANS: 3

$$\frac{-b}{a} = \frac{-6}{2} = -3. \quad \frac{c}{a} = \frac{4}{2} = 2$$

PTS: 2 REF: 011121a2 STA: A2.A.21 TOP: Roots of Quadratics
KEY: basic

47 ANS: 3

$$\sqrt{-300} = \sqrt{100} \sqrt{-1} \sqrt{3}$$

PTS: 2 REF: 061006a2 STA: A2.N.6 TOP: Square Roots of Negative Numbers

48 ANS: 3 PTS: 2 REF: 061127a2 STA: A2.S.6
TOP: Regression

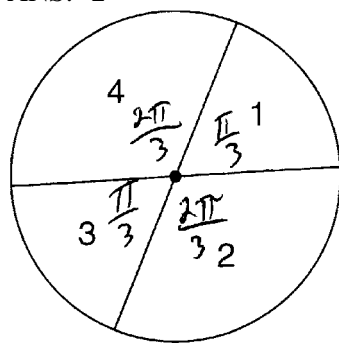
49 ANS: 1

$$\cos^2 \theta - \cos 2\theta = \cos^2 \theta - (\cos^2 \theta - \sin^2 \theta) = \sin^2 \theta$$

PTS: 2 REF: 061024a2 STA: A2.A.77 TOP: Double Angle Identities
KEY: simplifying

50 ANS: 4 PTS: 2 REF: 061120a2 STA: A2.A.19
TOP: Properties of Logarithms KEY: splitting logs

51 ANS: 2



$$\frac{\frac{\pi}{3} + \frac{\pi}{3}}{2\pi} = \frac{\frac{2\pi}{3}}{2\pi} = \frac{1}{3}$$

PTS: 2 REF: 011108a2 STA: A2.S.13 TOP: Geometric Probability

52 ANS: 4

Students entering the library are more likely to spend more time studying, creating bias.

PTS: 2 REF: fall0904a2 STA: A2.S.2 TOP: Analysis of Data

53 ANS: 2 PTS: 2 REF: 011126a2 STA: A2.A.49

TOP: Equations of Circles

54 ANS: 2 PTS: 2 REF: 061021a2 STA: A2.S.8

TOP: Correlation Coefficient

55 ANS: 1

n	3	4	5	Σ
$-r^2 + r$	$-3^2 + 3 = -6$	$-4^2 + 4 = -12$	$-5^2 + 5 = -20$	-38

PTS: 2 REF: 061118a2 STA: A2.N.10 TOP: Sigma Notation

KEY: basic

56 ANS: 3

$$a_n = 5(-2)^{n-1}$$

$$a_{15} = 5(-2)^{15-1} = 81,920$$

PTS: 2 REF: 011105a2 STA: A2.A.32 TOP: Sequences

57 ANS: 4

$$x^{-\frac{2}{5}} = \frac{1}{x^{\frac{2}{5}}} = \frac{1}{\sqrt[5]{x^2}}$$

PTS: 2 REF: 011118a2 STA: A2.A.10 TOP: Fractional Exponents as Radicals

58 ANS: 1 PTS: 2 REF: 081022a2 STA: A2.A.46

TOP: Transformations with Functions and Relations

59 ANS: 2

$$x^2 - x - 6 = 3x - 6$$

$$x^2 - 4x = 0$$

$$x(x - 4) = 0$$

$$x = 0, 4$$

PTS: 2 REF: 081015a2 STA: A2.A.3 TOP: Quadratic-Linear Systems
KEY: equations

60 ANS: 2 PTS: 2 REF: 061108a2 STA: A2.A.52
TOP: Identifying the Equation of a Graph

61 ANS: 2

$$\frac{10}{\sin 35} = \frac{13}{\sin B} \quad . \quad 35 + 48 < 180$$

$$B \approx 48, 132 \quad 35 + 132 < 180$$

PTS: 2 REF: 011113a2 STA: A2.A.75 TOP: Law of Sines - The Ambiguous Case

62 ANS: 1 PTS: 2 REF: 061019a2 STA: A2.N.7
TOP: Imaginary Numbers

63 ANS: 4 PTS: 2 REF: 011111a2 STA: A2.N.8
TOP: Conjugates of Complex Numbers

64 ANS: 3

$$x = 5^4 = 625$$

PTS: 2 REF: 061106a2 STA: A2.A.28 TOP: Logarithmic Equations
KEY: basic

65 ANS: 1

$$2i^2 + 3i^3 = 2(-1) + 3(-i) = -2 - 3i$$

PTS: 2 REF: 081004a2 STA: A2.N.7 TOP: Imaginary Numbers

66 ANS: 3 PTS: 2 REF: 011110a2 STA: A2.A.30
TOP: Sequences

67 ANS: 1 PTS: 2 REF: 011112a2 STA: A2.A.64
TOP: Using Inverse Trigonometric Functions KEY: advanced

68 ANS: 1

$${}_{10}C_4 = 210$$

PTS: 2 REF: 061113a2 STA: A2.S.11 TOP: Combinations

69 ANS: 2

$${}_{15}C_8 = 6,435$$

PTS: 2 REF: 081012a2 STA: A2.S.11 TOP: Combinations

70 ANS: 3

$$2\pi \cdot \frac{5}{12} = \frac{10\pi}{12} = \frac{5\pi}{6}$$

PTS: 2 REF: 061125a2 STA: A2.M.1 TOP: Radian Measure

71 ANS: 4 PTS: 2 REF: 061112a2 STA: A2.A.39

TOP: Domain and Range KEY: real domain

72 ANS: 3

$$27r^{4-1} = 64$$

$$r^3 = \frac{64}{27}$$

$$r = \frac{4}{3}$$

PTS: 2 REF: 081025a2 STA: A2.A.31 TOP: Conjugates of Complex Numbers

73 ANS: 3

$$x^2 - 3x - 10 > 0 \quad \text{or}$$

$$(x-5)(x+2) > 0 \quad x-5 < 0 \text{ and } x+2 < 0$$

$$x-5 > 0 \text{ and } x+2 > 0 \quad x < 5 \text{ and } x < -2$$

$$x > 5 \text{ and } x > -2 \quad x < -2$$

$$x > 5$$

PTS: 2 REF: 011115a2 STA: A2.A.4 TOP: Quadratic Inequalities

KEY: one variable

74 ANS: 2 PTS: 2 REF: 011114a2 STA: A2.N.3

TOP: Operations with Polynomials

75 ANS: 3 PTS: 2 REF: 061001a2 STA: A2.A.30

TOP: Sequences

76 ANS: 1 PTS: 2 REF: fall0914a2 STA: A2.A.8

TOP: Negative and Fractional Exponents

77 ANS: 2

$$\frac{11\pi}{12} \cdot \frac{180}{\pi} = 165$$

PTS: 2 REF: 061002a2 STA: A2.M.2 TOP: Radian Measure

KEY: degrees

78 ANS: 4 PTS: 2 REF: 061124a2 STA: A2.S.3

TOP: Central Tendency

79 ANS: 4

$$12x^4 + 10x^3 - 12x^2 = 2x^2(6x^2 + 5x - 6) = 2x^2(2x+3)(3x-2)$$

PTS: 2 REF: 061008a2 STA: A2.A.7 TOP: Factoring Polynomials

KEY: single variable

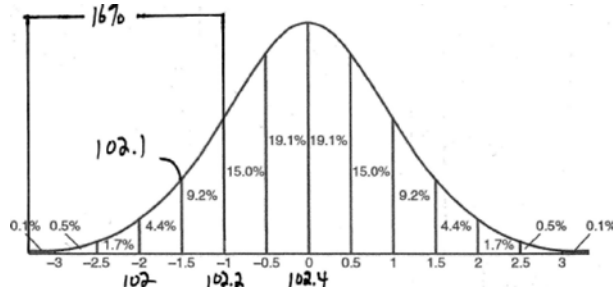
80 ANS: 3 PTS: 2 REF: fall0913a2 STA: A2.A.65
TOP: Graphing Trigonometric Functions

81 ANS: 3

$$\frac{3^{-2}}{(-2)^{-3}} = \frac{\frac{1}{9}}{-\frac{1}{8}} = -\frac{8}{9}$$

PTS: 2 REF: 061003a2 STA: A2.A.8 TOP: Negative and Fractional Exponents

82 ANS: 1



PTS: 2 REF: fall0915a2 STA: A2.S.5 TOP: Normal Distributions
KEY: interval

83 ANS: 3

$$4^{x^2+4x} = 2^{-6} \quad 2x^2 + 8x = -6$$

$$(2^2)^{x^2+4x} = 2^{-6} \quad 2x^2 + 8x + 6 = 0$$

$$2^{2x^2+8x} = 2^{-6} \quad x^2 + 4x + 3 = 0$$

$$(x+3)(x+1) = 0$$

$$x = -3 \quad x = -1$$

PTS: 2 REF: 061015a2 STA: A2.A.27 TOP: Exponential Equations
KEY: common base shown

84 ANS: 3 PTS: 2 REF: fall0923a2 STA: A2.A.39
TOP: Domain and Range KEY: real domain

85 ANS: 3

$$f(4) = \frac{1}{2}(4) - 3 = -1. \quad g(-1) = 2(-1) + 5 = 3$$

PTS: 2 REF: fall0902a2 STA: A2.A.42 TOP: Compositions of Functions
KEY: numbers

86 ANS: 2 PTS: 2 REF: 081024a2 STA: A2.N.8
TOP: Conjugates of Complex Numbers

87 ANS: 3 PTS: 2 REF: 061022a2 STA: A2.A.63
TOP: Domain and Range

88 ANS: 1

$$4a + 6 = 4a - 10. \quad 4a + 6 = -4a + 10. \quad \left| 4\left(\frac{1}{2}\right) + 6 \right| - 4\left(\frac{1}{2}\right) = -10$$

$$6 \neq -10 \quad 8a = 4 \quad 8 - 2 \neq -10$$

$$a = \frac{4}{8} = \frac{1}{2}$$

PTS: 2 REF: 011106a2 STA: A2.A.1 TOP: Absolute Value Equations

89 ANS: 2 PTS: 2 REF: 081003a2 STA: A2.A.51

TOP: Domain and Range

90 ANS: 1

$$2 \log x - (3 \log y + \log z) = \log x^2 - \log y^3 - \log z = \log \frac{x^2}{y^3 z}$$

PTS: 2 REF: 061010a2 STA: A2.A.19 TOP: Properties of Logarithms

91 ANS: 2

$$\frac{\frac{x}{4} - \frac{1}{x}}{\frac{1}{2x} + \frac{1}{4}} = \frac{\frac{x^2 - 4}{4x}}{\frac{2x + 4}{8x}} = \frac{(x+2)(x-2)}{4x} \times \frac{8x}{2(x+2)} = x - 2$$

PTS: 2 REF: fall0920a2 STA: A2.A.17 TOP: Complex Fractions

92 ANS: 4

$$2 \log_4(5x) = 3$$

$$\log_4(5x) = \frac{3}{2}$$

$$5x = 4^{\frac{3}{2}}$$

$$5x = 8$$

$$x = \frac{8}{5}$$

PTS: 2 REF: fall0921a2 STA: A2.A.28 TOP: Logarithmic Equations

KEY: advanced

93 ANS: 4

$$7^2 = 3^2 + 5^2 - 2(3)(5)\cos A$$

$$49 = 34 - 30\cos A$$

$$15 = -30\cos A$$

$$-\frac{1}{2} = \cos A$$

$$120 = \cos A$$

PTS: 2

REF: 081017a2

STA: A2.A.73

TOP: Law of Cosines

KEY: angle, without calculator

94 ANS: 3

PTS: 2

REF: 081007a2

STA: A2.A.64

TOP: Using Inverse Trigonometric Functions

KEY: basic

95 ANS: 3

$$\frac{4}{5 - \sqrt{13}} \cdot \frac{5 + \sqrt{13}}{5 + \sqrt{13}} = \frac{4(5 + \sqrt{13})}{25 - 13} = \frac{5 + \sqrt{13}}{3}$$

PTS: 2

REF: 061116a2

STA: A2.N.5

TOP: Rationalizing Denominators

96 ANS: 4

$$s = \theta r = 2 \cdot 4 = 8$$

PTS: 2

REF: fall0922a2

STA: A2.A.61

TOP: Arc Length

KEY: arc length

97 ANS: 3

$$\frac{59.2}{\sin 74} = \frac{60.3}{\sin C} \quad 180 - 78.3 = 101.7$$

$$C \approx 78.3$$

PTS: 2

REF: 081006a2

STA: A2.A.75

TOP: Law of Sines - The Ambiguous Case

98 ANS: 2

$$6(x^2 - 5) = 6x^2 - 30$$

PTS: 2

REF: 011109a2

STA: A2.A.42

TOP: Compositions of Functions

KEY: variables

99 ANS: 3

PTS: 2

REF: 061114a2

STA: A2.A.38

TOP: Defining Functions

KEY: graphs

100 ANS: 3

PTS: 2

REF: 061119a2

STA: A2.A.65

TOP: Graphing Trigonometric Functions

101 ANS: 1

$${}_9C_3 a^6 (-4b)^3 = -5376 a^6 b^3$$

PTS: 2

REF: 061126a2

STA: A2.A.36

TOP: Binomial Expansions

102 ANS: 4

$$(3 + \sqrt{5})(3 - \sqrt{5}) = 9 - \sqrt{25} = 4$$

PTS: 2 REF: 081001a2 STA: A2.N.2 TOP: Operations with Radicals

103 ANS: 1 PTS: 2 REF: 011117a2 STA: A2.S.9

TOP: Differentiating Permutations and Combinations

104 ANS: 1

$$6x - 7 \leq 5 \quad 6x - 7 \geq -5$$

$$6x \leq 12 \quad 6x \geq 2$$

$$x \leq 2 \quad x \geq \frac{1}{3}$$

PTS: 2 REF: fall0905a2 STA: A2.A.1 TOP: Absolute Value Inequalities

KEY: graph

105 ANS: 2

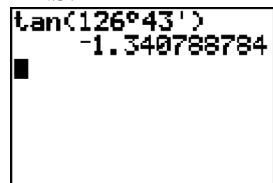
$$\frac{2\pi}{b} = \frac{2\pi}{3}$$

PTS: 2 REF: 061111a2 STA: A2.A.69

TOP: Properties of Graphs of Trigonometric Functions

KEY: period

106 ANS: 2



A calculator screen showing the calculation of the tangent of an angle. The input is $\tan(126^\circ 43')$ and the output is -1.340788784 .

PTS: 2 REF: 061115a2 STA: A2.A.66 TOP: Determining Trigonometric Functions

107 ANS: 3

$$\frac{-7 \pm \sqrt{7^2 - 4(2)(-3)}}{2(2)} = \frac{-7 \pm \sqrt{73}}{4}$$

PTS: 2 REF: 081009a2 STA: A2.A.25 TOP: Quadratic Formula

108 ANS: 4 PTS: 2 REF: 011101a2 STA: A2.A.38

TOP: Defining Functions KEY: graphs

109 ANS: 3

$$\frac{\sin^2 \theta + \cos^2 \theta}{1 - \sin^2 \theta} = \frac{1}{\cos^2 \theta} = \sec^2 \theta$$

PTS: 2 REF: 061123a2 STA: A2.A.58 TOP: Reciprocal Trigonometric Relationships

110 ANS: 2 PTS: 2 REF: 061122a2 STA: A2.A.24

TOP: Completing the Square

111 ANS: 2

$$\frac{x^{-1}-1}{x-1} = \frac{\frac{1}{x}-1}{x-1} = \frac{\frac{1-x}{x}}{x-1} = \frac{-(x-1)}{x(x-1)} = -\frac{1}{x}$$

PTS: 2 REF: 081018a2 STA: A2.A.9 TOP: Negative Exponents

112 ANS: 4

$$\frac{2x+4}{\sqrt{x+2}} \cdot \frac{\sqrt{x+2}}{\sqrt{x+2}} = \frac{2(x+2)\sqrt{x+2}}{x+2} = 2\sqrt{x+2}$$

PTS: 2 REF: 011122a2 STA: A2.A.15 TOP: Rationalizing Denominators

KEY: index = 2

113 ANS: 1

$$13^2 = 15^2 + 14^2 - 2(15)(14)\cos C$$

$$169 = 421 - 420\cos C$$

$$-252 = -420\cos C$$

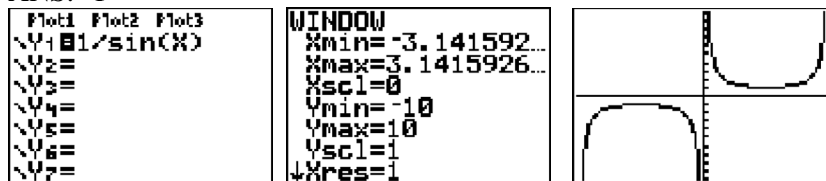
$$\frac{252}{420} = \cos C$$

$$53 \approx C$$

PTS: 2 REF: 061110a2 STA: A2.A.73 TOP: Law of Cosines

KEY: find angle

114 ANS: 1



PTS: 2 REF: 011123a2 STA: A2.A.71 TOP: Graphing Trigonometric Functions

115 ANS: 4

$$y - 2\sin\theta = 3$$

$$y = 2\sin\theta + 3$$

$$f(\theta) = 2\sin\theta + 3$$

PTS: 2 REF: fall0927a2 STA: A2.A.40 TOP: Functional Notation

116 ANS: 4 PTS: 2 REF: 061005a2 STA: A2.A.50

TOP: Solving Polynomial Equations

117 ANS: 4 PTS: 2 REF: 061026a2 STA: A2.A.29

TOP: Sequences

118 ANS: 2

$$4^{2x+5} = 8^{3x}$$

$$\left(2^2\right)^{2x+5} = \left(2^3\right)^{3x}$$

$$2^{4x+10} = 2^{9x}$$

$$4x + 10 = 9x$$

$$10 = 5x$$

$$2 = x$$

PTS: 2 REF: 061105a2 STA: A2.A.27 TOP: Exponential Equations
KEY: common base not shown

119 ANS: 3

$$K = (10)(18)\sin 46 \approx 129$$

PTS: 2 REF: 081021a2 STA: A2.A.74 TOP: Using Trigonometry to Find Area
KEY: parallelograms

120 ANS: 4

(4) fails the horizontal line test. Not every element of the range corresponds to only one element of the domain.

PTS: 2 REF: fall0906a2 STA: A2.A.43 TOP: Defining Functions

121 ANS: 1

$$a_n = -\sqrt{5}(-\sqrt{2})^{n-1}$$

$$a_{15} = -\sqrt{5}(-\sqrt{2})^{15-1} = -\sqrt{5}(-\sqrt{2})^{14} = -\sqrt{5} \cdot 2^7 = -128\sqrt{5}$$

PTS: 2 REF: 061109a2 STA: A2.A.32 TOP: Sequences

122 ANS: 2 PTS: 2 REF: 061011a2 STA: A2.A.10
TOP: Fractional Exponents as Radicals

123 ANS: 4 PTS: 2 REF: 011127a2 STA: A2.S.1
TOP: Analysis of Data

124 ANS: 4 PTS: 2 REF: 081005a2 STA: A2.A.60
TOP: Unit Circle

125 ANS: 1

$${}_5C_3(3x)^2(-2)^3 = 10 \cdot 9x^2 \cdot -8 = -720x^2$$

PTS: 2 REF: fall0919a2 STA: A2.A.36 TOP: Binomial Expansions

126 ANS: 2

$$x^2 + 2 = 6x$$

$$x^2 - 6x = -2$$

$$x^2 - 6x + 9 = -2 + 9$$

$$(x - 3)^2 = 7$$

PTS: 2

REF: 011116a2

STA: A2.A.24

TOP: Completing the Square

127 ANS: 1

$$\sqrt{12^2 - 6^2} = \sqrt{108} = \sqrt{36} \sqrt{3} = 6\sqrt{3}. \cot J = \frac{A}{O} = \frac{6}{6\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

PTS: 2

REF: 011120a2

STA: A2.A.55

TOP: Trigonometric Ratios

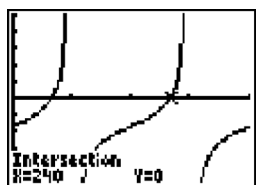
128 ANS: 1

$$\tan \theta - \sqrt{3} = 0$$

$$\tan \theta = \sqrt{3}$$

$$\theta = \tan^{-1} \sqrt{3}$$

$$\theta = 60, 240$$



PTS: 2

REF: fall0903a2

STA: A2.A.68

TOP: Trigonometric Equations

KEY: basic

129 ANS: 4

$$\frac{3 \pm \sqrt{(-3)^2 - 4(1)(-9)}}{2(1)} = \frac{3 \pm \sqrt{45}}{2} = \frac{3 \pm 3\sqrt{5}}{2}$$

PTS: 2

REF: 061009a2

STA: A2.A.25

TOP: Quadratic Formula

130 ANS: 3

PTS: 2

REF: 081027a2

STA: A2.A.44

TOP: Inverse of Functions

KEY: equations

131 ANS: 3

$$68\% \times 50 = 34$$

PTS: 2

REF: 081013a2

STA: A2.S.5

TOP: Normal Distributions

KEY: predict

132 ANS: 1

PTS: 2

REF: 061025a2

STA: A2.A.34

TOP: Sigma Notation

133 ANS: 2

$$x^3 + x^2 - 2x = 0$$

$$x(x^2 + x - 2) = 0$$

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

$$x = 0, -2, 1$$

PTS: 2

REF: 011103a2

STA: A2.A.26

TOP: Solving Polynomial Equations

134 ANS: 2

PTS: 2

REF: 081010a2

STA: A2.A.55

TOP: Trigonometric Ratios

135 ANS: 3

1-Var Stats L1:L	σx^2
z	67.31102041

PTS: 2

REF: fall0924a2

STA: A2.S.4

TOP: Dispersion

KEY: variance

**Algebra 2/Trigonometry 2 Point Regents Exam Questions
Answer Section**

1 ANS:

$$(x+5)^2 + (y-3)^2 = 32$$

PTS: 2 REF: 081033a2 STA: A2.A.49 TOP: Writing Equations of Circles

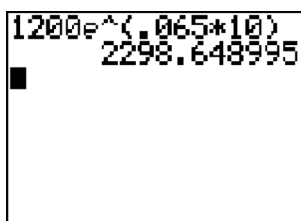
2 ANS:

7.4

PTS: 2 REF: 061029a2 STA: A2.S.4 TOP: Dispersion

KEY: basic, group frequency distributions

3 ANS:



2,298.65.

PTS: 2 REF: fall0932a2 STA: A2.A.12 TOP: Evaluating Exponential Expressions

4 ANS:

$$(x+3)^2 + (y-4)^2 = 25$$

PTS: 2 REF: fall0929a2 STA: A2.A.49 TOP: Writing Equations of Circles

5 ANS:

$$\frac{12x^2}{y^9} \cdot \frac{3x^{-4}y^5}{(2x^3y^{-7})^{-2}} = \frac{3y^5(2x^3y^{-7})^2}{x^4} = \frac{3y^5(4x^6y^{-14})}{x^4} = \frac{12x^6y^{-9}}{x^4} = \frac{12x^2}{y^9}$$

PTS: 2 REF: 061134a2 STA: A2.A.9 TOP: Negative Exponents

6 ANS:

$$\frac{\frac{1}{2} - \frac{4}{d}}{\frac{1}{d} + \frac{3}{2d}} = \frac{\frac{d-8}{2d}}{\frac{2d+3d}{2d^2}} = \frac{d-8}{2d} \times \frac{2d^2}{5d} = \frac{d-8}{5}$$

PTS: 2 REF: 061035a2 STA: A2.A.17 TOP: Complex Fractions

7 ANS:

$$\frac{\sqrt{13}}{2} \cdot \sin \theta = \frac{y}{\sqrt{x^2+y^2}} = \frac{2}{\sqrt{(-3)^2+2^2}} = \frac{2}{\sqrt{13}} \cdot \csc \theta = \frac{\sqrt{13}}{2}$$

PTS: 2 REF: fall0933a2 STA: A2.A.62 TOP: Determining Trigonometric Functions

8 ANS:

$$5\sqrt{3x^3} - 2\sqrt{27x^3} = 5\sqrt{x^2} \sqrt{3x} - 2\sqrt{9x^2} \sqrt{3x} = 5x\sqrt{3x} - 6x\sqrt{3x} = -x\sqrt{3x}$$

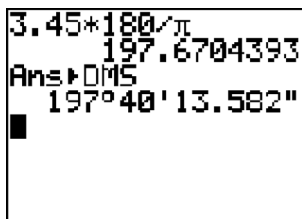
PTS: 2 REF: 061032a2 STA: A2.N.2 TOP: Operations with Radicals

9 ANS:

$$7. f(-3) = (-3)^2 - 6 = 3. \quad g(x) = 2^3 - 1 = 7.$$

PTS: 2 REF: 061135a2 STA: A2.A.42 TOP: Compositions of Functions
KEY: numbers

10 ANS:



$$197^\circ 40'. \quad 3.45 \times \frac{180}{\pi} \approx 197^\circ 40'.$$

PTS: 2 REF: fall0931a2 STA: A2.M.2 TOP: Radian Measure
KEY: degrees

11 ANS:

$$K = ab \sin C = 24 \cdot 30 \sin 57 \approx 604$$

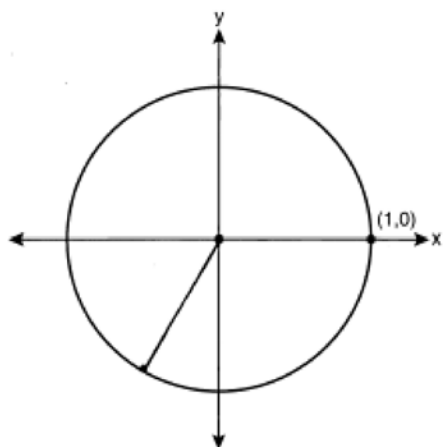
PTS: 2 REF: 061034a2 STA: A2.A.74 TOP: Using Trigonometry to Find Area
KEY: parallelograms

12 ANS:

41,040.

PTS: 2 REF: fall0935a2 STA: A2.S.12 TOP: Sample Space

13 ANS:



$$-\frac{\sqrt{3}}{2}$$

PTS: 2

REF: 061033a2

STA: A2.A.60

TOP: Unit Circle

14 ANS:

$$\frac{\sqrt{108x^5y^8}}{\sqrt{6xy^5}} = \sqrt{18x^4y^3} = 3x^2y\sqrt{2y}$$

PTS: 2

REF: 011133a2

STA: A2.A.14

TOP: Operations with Radicals

KEY: with variables | index = 2

15 ANS:

$$45, 225 \quad 2 \tan C - 3 = 3 \tan C - 4$$

$$1 = \tan C$$

$$\tan^{-1} 1 = C$$

$$C = 45, 225$$

PTS: 2

REF: 081032a2

STA: A2.A.68

TOP: Trigonometric Equations

KEY: basic

16 ANS:

$$12t^8 - 75t^4 = 3t^4(4t^4 - 25) = 3t^4(2t^2 + 5)(2t^2 - 5)$$

PTS: 2

REF: 061133a2

STA: A2.A.7

TOP: Factoring the Difference of Perfect Squares

KEY: binomial

17 ANS:

$$\frac{4}{9}x^2 - \frac{4}{3}x + 1 = \left(\frac{2}{3}x - 1\right)^2 = \left(\frac{2}{3}x - 1\right)\left(\frac{2}{3}x - 1\right) = \frac{4}{9}x^2 - \frac{2}{3}x - \frac{2}{3}x + 1 = \frac{4}{9}x^2 - \frac{4}{3}x + 1$$

PTS: 2

REF: 081034a2

STA: A2.N.3

TOP: Operations with Polynomials

18 ANS:

$$2.5 \cdot \frac{180}{\pi} \approx 143.2^\circ$$

PTS: 2 REF: 011129a2 STA: A2.M.2 TOP: Radian Measure
KEY: degrees

19 ANS:

$$\text{Sum } \frac{-b}{a} = -\frac{11}{5}. \text{ Product } \frac{c}{a} = -\frac{3}{5}$$

PTS: 2 REF: 061030a2 STA: A2.A.20 TOP: Roots of Quadratics

20 ANS:

$$y = x^2 - 6. f^{-1}(x) \text{ is not a function.}$$

$$x = y^2 - 6$$

$$x + 6 = y^2$$

$$\pm\sqrt{x+6} = y$$

PTS: 2 REF: 061132a2 STA: A2.A.44 TOP: Inverse of Functions
KEY: equations

21 ANS:

$$12 \cdot 6 = 9w$$

$$8 = w$$

PTS: 2 REF: 011130a2 STA: A2.A.5 TOP: Inverse Variation

22 ANS:

no. over 20 is more than 1 standard deviation above the mean. $0.159 \cdot 82 \approx 13.038$

PTS: 2 REF: 061129a2 STA: A2.S.5 TOP: Normal Distributions
KEY: predict

23 ANS:

$$\sum_{n=1}^{15} 7n$$

PTS: 2 REF: 081029a2 STA: A2.A.34 TOP: Sigma Notation

24 ANS:

$$16^{2x+3} = 64^{x+2}$$

$$(4^2)^{2x+3} = (4^3)^{x+2}$$

$$4x + 6 = 3x + 6$$

$$x = 0$$

PTS: 2 REF: 011128a2 STA: A2.A.27 TOP: Exponential Equations
KEY: common base not shown

25 ANS:

$$e^{3\ln 2} = e^{\ln 2^3} = e^{\ln 8} = 8$$

PTS: 2 REF: 061131a2 STA: A2.A.12 TOP: Evaluating Exponential Expressions

26 ANS:

$$\text{no solution. } \frac{4x}{x-3} = 2 + \frac{12}{x-3}$$

$$\frac{4x-12}{x-3} = 2$$

$$\frac{4(x-3)}{x-3} = 2$$

$$4 \neq 2$$

PTS: 2 REF: fall0930a2 STA: A2.A.23 TOP: Solving Rationals

KEY: rational solutions

27 ANS:

$$y = 10.596(1.586)^x$$

PTS: 2 REF: 081031a2 STA: A2.S.7 TOP: Exponential Regression

28 ANS:

$$10ax^2 - 23ax - 5a = a(10x^2 - 23x - 5) = a(5x + 1)(2x - 5)$$

PTS: 2 REF: 081028a2 STA: A2.A.7 TOP: Factoring Polynomials

KEY: multiple variables

29 ANS:

$$230. 10 + (1^3 - 1) + (2^3 - 1) + (3^3 - 1) + (4^3 - 1) + (5^3 - 1) = 10 + 0 + 7 + 26 + 63 + 124 = 230$$

PTS: 2 REF: 011131a2 STA: A2.N.10 TOP: Sigma Notation

KEY: basic

30 ANS:

$$b^2 - 4ac = 0$$

$$k^2 - 4(1)(4) = 0$$

$$k^2 - 16 = 0$$

$$(k + 4)(k - 4) = 0$$

$$k = \pm 4$$

PTS: 2 REF: 061028a2 STA: A2.A.2 TOP: Using the Discriminant

KEY: determine equation given nature of roots

31 ANS:

$$D: -5 \leq x \leq 8. \quad R: -3 \leq y \leq 2$$

PTS: 2 REF: 011132a2 STA: A2.A.51 TOP: Domain and Range

32 ANS:

$$\frac{5(3+\sqrt{2})}{7} \cdot \frac{5}{3-\sqrt{2}} \times \frac{3+\sqrt{2}}{3+\sqrt{2}} = \frac{5(3+\sqrt{2})}{9-2} = \frac{5(3+\sqrt{2})}{7}$$

PTS: 2 REF: fall0928a2 STA: A2.N.5 TOP: Rationalizing Denominators

33 ANS:

$$\frac{\sin^2 A}{\cos^2 A} + \frac{\cos^2 A}{\cos^2 A} = \frac{1}{\cos^2 A}$$

$$\tan^2 A + 1 = \sec^2 A$$

PTS: 2 REF: 011135a2 STA: A2.A.67 TOP: Proving Trigonometric Identities

34 ANS:

-3, -5, -8, -12

PTS: 2 REF: fall0934a2 STA: A2.A.33 TOP: Recursive Sequences

35 ANS:

$$x^2 - 6x - 27 = 0, \frac{-b}{a} = 6, \frac{c}{a} = -27. \text{ If } a = 1 \text{ then } b = -6 \text{ and } c = -27$$

PTS: 4 REF: 061130a2 STA: A2.A.21 TOP: Roots of Quadratics

KEY: basic

36 ANS:

Controlled experiment because Howard is comparing the results obtained from an experimental sample against a control sample.

PTS: 2 REF: 081030a2 STA: A2.S.1 TOP: Analysis of Data

37 ANS:

$$39,916,800 \cdot \frac{{}_{12}P_{12}}{3! \cdot 2!} = \frac{479,001,600}{12} = 39,916,800$$

PTS: 2 REF: 081035a2 STA: A2.S.10 TOP: Permutations

38 ANS:

$$6y^3 - \frac{37}{10}y^2 - \frac{1}{5}y \cdot \left(\frac{1}{2}y^2 - \frac{1}{3}y \right) \left(12y + \frac{3}{5} \right) = 6y^3 + \frac{3}{10}y^2 - 4y^2 - \frac{1}{5}y = 6y^3 - \frac{37}{10}y^2 - \frac{1}{5}y$$

PTS: 2 REF: 061128a2 STA: A2.N.3 TOP: Operations with Polynomials

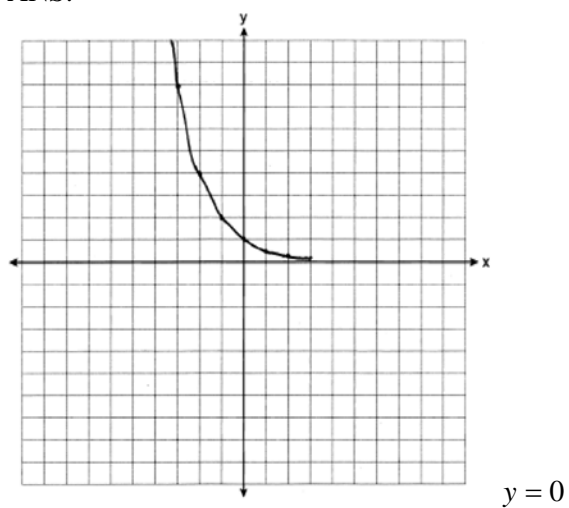
39 ANS:

68% of the students are within one standard deviation of the mean. 16% of the students are more than one standard deviation above the mean.

PTS: 2 REF: 011134a2 STA: A2.S.5 TOP: Normal Distributions

KEY: percent

40 ANS:



PTS: 2

REF: 061031a2

STA: A2.A.53

TOP: Graphing Exponential Functions

Algebra 2/Trigonometry 4 Point Regents Exam Questions Answer Section

1 ANS:

$$\frac{23}{2} \quad \cos^2 B + \sin^2 B = 1 \quad \tan B = \frac{\sin B}{\cos B} = \frac{\frac{5}{\sqrt{41}}}{\frac{4}{\sqrt{41}}} = \frac{5}{4} \quad \tan(A+B) = \frac{\frac{2}{3} + \frac{5}{4}}{1 - \left(\frac{2}{3}\right)\left(\frac{5}{4}\right)} = \frac{\frac{8+15}{12}}{\frac{12}{12} - \frac{10}{12}} = \frac{\frac{23}{12}}{\frac{2}{12}} = \frac{23}{2}$$

$$\cos^2 B + \left(\frac{5}{\sqrt{41}}\right)^2 = 1$$

$$\cos^2 B + \frac{25}{41} = \frac{41}{41}$$

$$\cos^2 B = \frac{16}{41}$$

$$\cos B = \frac{4}{\sqrt{41}}$$

PTS: 4 REF: 081037a2 STA: A2.A.76 TOP: Angle Sum and Difference Identities
KEY: evaluating

2 ANS:

$$y = 2.001x^{2.298}, 1,009. \quad y = 2.001(15)^{2.298} \approx 1009$$

PTS: 4 REF: fall0938a2 STA: A2.S.7 TOP: Power Regression

3 ANS:

$$0.167. \quad {}_{10}C_8 \cdot 0.6^8 \cdot 0.4^2 + {}_{10}C_9 \cdot 0.6^9 \cdot 0.4^1 + {}_{10}C_{10} \cdot 0.6^{10} \cdot 0.4^0 \approx 0.167$$

PTS: 4 REF: 061036a2 STA: A2.S.15 TOP: Binomial Probability
KEY: at least or at most

4 ANS:

$$0.468. \quad {}_8C_6 \left(\frac{2}{3}\right)^6 \left(\frac{1}{3}\right)^2 \approx 0.27313. \quad {}_8C_7 \left(\frac{2}{3}\right)^7 \left(\frac{1}{3}\right)^1 \approx 0.15607. \quad {}_8C_8 \left(\frac{2}{3}\right)^8 \left(\frac{1}{3}\right)^0 \approx 0.03902.$$

PTS: 4 REF: 011138a2 STA: A2.S.15 TOP: Binomial Probability
KEY: at least or at most

5 ANS:

$$\frac{12}{\sin 32} = \frac{10}{\sin B} \quad . \quad C \approx 180 - (32 + 26.2) \approx 121.8. \quad \frac{12}{\sin 32} = \frac{c}{\sin 121.8}$$

$$B = \sin^{-1} \frac{10 \sin 32}{12} \approx 26.2 \quad c = \frac{12 \sin 121.8}{\sin 32} \approx 19.2$$

PTS: 4 REF: 011137a2 STA: A2.A.73 TOP: Law of Sines
KEY: basic

6 ANS:

$$3 \pm \sqrt{7}. \quad 2x^2 - 12x + 4 = 0$$

$$x^2 - 6x + 2 = 0$$

$$x^2 - 6x = -2$$

$$x^2 - 6x + 9 = -2 + 9$$

$$(x-3)^2 = 7$$

$$x-3 = \pm\sqrt{7}$$

$$x = 3 \pm \sqrt{7}$$

PTS: 4

REF: fall0936a2

STA: A2.A.24

TOP: Completing the Square

7 ANS:

$$\pm\frac{3}{2}, -\frac{1}{2}. \quad 8x^3 + 4x^2 - 18x - 9 = 0$$

$$4x^2(2x+1) - 9(2x+1) = 0$$

$$(4x^2 - 9)(2x+1) = 0$$

$$4x^2 - 9 = 0 \text{ or } 2x + 1 = 0$$

$$(2x+3)(2x-3) = 0 \quad x = -\frac{1}{2}$$

$$x = \pm\frac{3}{2}$$

PTS: 4

REF: fall0937a2

STA: A2.A.26

TOP: Solving Polynomial Equations

8 ANS:

$$\sin(45 + 30) = \sin 45 \cos 30 + \cos 45 \sin 30$$

$$= \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} + \frac{\sqrt{2}}{2} \cdot \frac{1}{2} = \frac{\sqrt{6}}{4} + \frac{\sqrt{2}}{4} = \frac{\sqrt{6} + \sqrt{2}}{4}$$

PTS: 4

REF: 061136a2

STA: A2.A.76

TOP: Angle Sum and Difference Identities

KEY: evaluating

9 ANS:

$$\frac{51}{243} \cdot {}_5C_3 \left(\frac{1}{3}\right)^3 \left(\frac{2}{3}\right)^2 = \frac{40}{243}$$

$${}_5C_4 \left(\frac{1}{3}\right)^4 \left(\frac{2}{3}\right)^1 = \frac{10}{243}$$

$${}_5C_3 \left(\frac{1}{3}\right)^5 \left(\frac{2}{3}\right)^0 = \frac{1}{243}$$

PTS: 4 REF: 061138a2 STA: A2.S.15 TOP: Binomial Probability

KEY: at least or at most

10 ANS:

$$\text{No. TENNESSEE: } \frac{{}_9P_9}{4! \cdot 2! \cdot 2!} = \frac{362,880}{96} = 3,780. \text{ VERMONT: } {}_7P_7 = 5,040$$

PTS: 4 REF: 061038a2 STA: A2.S.10 TOP: Permutations

11 ANS:

$$32x^5 - 80x^4 + 80x^3 - 40x^2 + 10x - 1. \quad {}_5C_0(2x)^5(-1)^0 = 32x^5. \quad {}_5C_1(2x)^4(-1)^1 = -80x^4. \quad {}_5C_2(2x)^3(-1)^2 = 80x^3. \\ {}_5C_3(2x)^2(-1)^3 = -40x^2. \quad {}_5C_4(2x)^1(-1)^4 = 10x. \quad {}_5C_5(2x)^0(-1)^5 = -1$$

PTS: 4 REF: 011136a2 STA: A2.A.36 TOP: Binomial Expansions

12 ANS:

$$-3|6-x| < -15 \quad . \quad \begin{array}{c} \longleftarrow \text{---} \text{---} \text{---} \text{---} \text{---} \text{---} \text{---} \text{---} \text{---} \text{---} \longrightarrow \\ \circ \\ | | \\ \end{array}$$

$$|6-x| > 5$$

$$6-x > 5 \text{ or } 6-x < -5$$

$$1 > x \text{ or } 11 < x$$

PTS: 2 REF: 061137a2 STA: A2.A.1 TOP: Absolute Value Inequalities

KEY: graph

13 ANS:

$$\frac{1}{3} - \frac{1}{x+3} - \frac{2}{3-x} = \frac{4}{x^2-9}$$

$$\frac{1}{x+3} + \frac{2}{x-3} = \frac{4}{x^2-9}$$

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

$$x-3+2x+6=4$$

$$3x=1$$

$$x = \frac{1}{3}$$

PTS: 4 REF: 081036a2 STA: A2.A.23 TOP: Solving Rationals

KEY: rational solutions

14 ANS:

$$0, 60, 180, 300. \quad \sin 2\theta = \sin \theta$$

$$\sin 2\theta - \sin \theta = 0$$

$$2 \sin \theta \cos \theta - \sin \theta = 0$$

$$\sin \theta (2 \cos \theta - 1) = 0$$

$$\sin \theta = 0 \quad 2 \cos \theta - 1 = 0$$

$$\theta = 0, 180 \quad \cos \theta = \frac{1}{2}$$

$$\theta = 60, 300$$

PTS: 4 REF: 061037a2 STA: A2.A.68 TOP: Trigonometric Equations

KEY: double angle identities

15 ANS:

$$26.2\% \cdot {}_{10}C_8 \cdot 0.65^8 \cdot 0.35^2 + {}_{10}C_9 \cdot 0.65^9 \cdot 0.35^1 + {}_{10}C_{10} \cdot 0.65^{10} \cdot 0.35^0 \approx 0.262$$

PTS: 4 REF: 081038a2 STA: A2.S.15 TOP: Binomial Probability

KEY: at least or at most

Algebra 2/Trigonometry 6 Point Regents Exam Questions Answer Section

1 ANS:

$$33. a = \sqrt{10^2 + 6^2 - 2(10)(6) \cos 80} \approx 10.7. \angle C \text{ is opposite the shortest side. } \frac{6}{\sin C} = \frac{10.7}{\sin 80}$$

$$C \approx 33$$

PTS: 6 REF: 061039a2 STA: A2.A.73 TOP: Law of Cosines
KEY: advanced

2 ANS:

$$\ln(T - T_0) = -kt + 4.718 \quad \ln(T - 68) = -0.104(10) + 4.718.$$

$$\ln(150 - 68) = -k(3) + 4.718 \quad \ln(T - 68) = 3.678$$

$$4.407 \approx -3k + 4.718 \quad T - 68 \approx 39.6$$

$$k \approx 0.104 \quad T \approx 108$$

PTS: 6 REF: 011139a2 STA: A2.A.28 TOP: Logarithmic Equations
KEY: advanced

3 ANS:

$$x = -\frac{1}{3}, -1 \quad \log_{x+3} \frac{x^3 + x - 2}{x} = 2$$

$$\frac{x^3 + x - 2}{x} = (x + 3)^2$$

$$\frac{x^3 + x - 2}{x} = x^2 + 6x + 9$$

$$x^3 + x - 2 = x^3 + 6x^2 + 9x$$

$$0 = 6x^2 + 8x + 2$$

$$0 = 3x^2 + 4x + 1$$

$$0 = (3x + 1)(x + 1)$$

$$x = -\frac{1}{3}, -1$$

PTS: 6 REF: 081039a2 STA: A2.A.28 TOP: Logarithmic Equations
KEY: basic

4 ANS:

$$\left(-\frac{9}{2}, \frac{1}{2}\right) \text{ and } \left(\frac{1}{2}, \frac{11}{2}\right). \quad y = x + 5 \quad . \quad 4x^2 + 17x - 4 = x + 5$$

$$y = 4x^2 + 17x - 4 \quad 4x^2 + 16x - 9 = 0$$

$$(2x + 9)(2x - 1) = 0$$

$$x = -\frac{9}{2} \text{ and } x = \frac{1}{2}$$

$$y = -\frac{9}{2} + 5 = \frac{1}{2} \text{ and } y = \frac{1}{2} + 5 = \frac{11}{2}$$

PTS: 6

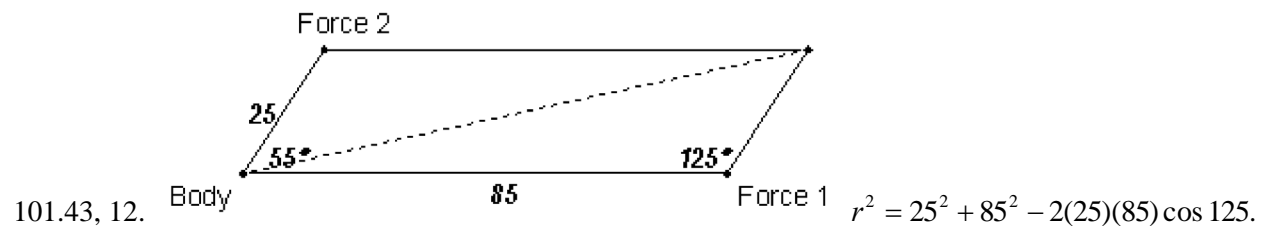
REF: 061139a2

STA: A2.A.3

TOP: Quadratic-Linear Systems

KEY: equations

5 ANS:



$$r^2 = 25^2 + 85^2 - 2(25)(85) \cos 125.$$

$$r^2 \approx 10287.7$$

$$r \approx 101.43$$

$$\frac{2.5}{\sin x} = \frac{101.43}{\sin 125}$$

$$x \approx 12$$

PTS: 6

REF: fall0939a2

STA: A2.A.73

TOP: Vectors