

JEFFERSON MATH PROJECT REGENTS AT RANDOM

The NY Algebra 2/Trigonometry Regents Exams
Fall 2009-August 2010
(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 Regents at Random Answer Section

1 ANS:

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

PTS: 2 REF: 081035a2 TOP: Permutations

2 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 TOP: Operations with Radicals

KEY: with variables | index = 2

3 ANS:

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

PTS: 2 REF: 081029a2 TOP: Sigma Notation

4 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 TOP: Rationalizing Denominators

KEY: index = 2

5 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 TOP: Exponential Equations

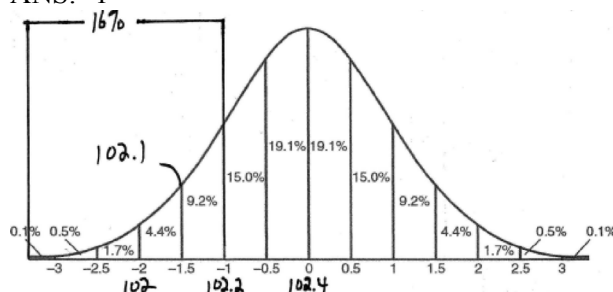
KEY: common base shown

6 ANS: 4

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

PTS: 2 REF: fall0904a2 TOP: Analysis of Data

7 ANS: 1



PTS: 2 REF: fall0915a2 TOP: Normal Distributions

KEY: interval

8 ANS: 2

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

PTS: 2 REF: 061002a2 TOP: Radian Measure

KEY: degrees

9 ANS: 2

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

PTS: 2 REF: fall0901a2 TOP: Multiplication and Division of Complex Numbers

10 ANS:

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

PTS: 2 REF: 081030a2 TOP: Analysis of Data

11 ANS: 3

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

PTS: 2 REF: fall0912a2 TOP: Roots of Quadratics

KEY: basic

12 ANS: 4 PTS: 2 REF: 081005a2 TOP: Unit Circle

13 ANS: 2

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

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

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

$$x = 0, 4$$

PTS: 2 REF: 081015a2 TOP: Quadratic-Linear Systems

KEY: equations

14 ANS: 3
 $68\% \times 50 = 34$

PTS: 2 REF: 081013a2 TOP: Normal Distributions

KEY: predict

15 ANS:

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

PTS: 2 REF: 061030a2 TOP: Roots of Quadratics

16 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 TOP: Solving Polynomial Equations

17 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 TOP: Complex Fractions

18 ANS: 1 PTS: 2 REF: 061018a2 TOP: Solving Radicals

KEY: extraneous solutions

19 ANS: 3

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

PTS: 2 REF: fall0902a2 TOP: Compositions of Functions

KEY: numbers

20 ANS: 3

Cofunctions tangent and cotangent are complementary

PTS: 2 REF: 061014a2 TOP: Cofunction Trigonometric Relationships

21 ANS: 2

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

PTS: 2 REF: fall0916a2 TOP: Graphing Logarithmic Functions

22 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 TOP: Solving Rationals

KEY: rational solutions

23 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 TOP: Sigma Notation

KEY: basic

24 ANS: 2

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

PTS: 2 REF: 081011a2 TOP: Negative and Fractional Exponents

25 ANS:

7.4

PTS: 2 REF: 061029a2 TOP: Dispersion KEY: basic, group frequency distributions

26 ANS: 1 PTS: 2 REF: 061013a2 TOP: Defining Functions

27 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 TOP: Completing the Square

28 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 TOP: Solving Rationals

KEY: rational solutions

29 ANS: 1

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

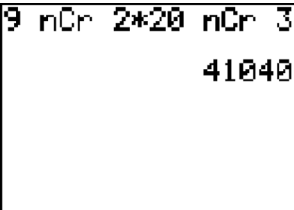
$$10 = x + 2(1)$$

$$8 = x$$

PTS: 2 REF: 081014a2 TOP: Sequences

30 ANS: 3 PTS: 2 REF: 061001a2 TOP: Sequences

31 ANS:



9 nCr 2 * 20 nCr 3
41040

41,040.

PTS: 2 REF: fall0935a2 TOP: Combinations

32 ANS: 3

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

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

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

PTS: 2 REF: 081025a2 TOP: Conjugates of Complex Numbers

33 ANS: 2

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

PTS: 2 REF: 081012a2 TOP: Combinations

34 ANS:

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

PTS: 2 REF: 081031a2 TOP: Exponential Regression

35 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 TOP: Operations with Radicals

36 ANS:

0, 60, 180, 300.

$$\sin 2\theta = \sin \theta$$

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

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

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

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

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

$$\theta = 60, 300$$

PTS: 2 REF: 061037a2 TOP: Trigonometric Equations

KEY: double angle identities

37 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 TOP: Law of Sines

KEY: angle, without calculator

38 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 TOP: Quadratic Formula

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 TOP: Defining Functions

40 ANS: 1

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

PTS: 2 REF: 061024a2 TOP: Double Angle Identities
KEY: simplifying

41 ANS: 2

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

PTS: 2 REF: 081023a2 TOP: Solving Polynomial Equations

42 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 TOP: Binomial Probability
KEY: at least or at most

43 ANS: 4

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

PTS: 2 REF: 081001a2 TOP: Operations with Radicals

44 ANS:

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

PTS: 2 REF: 081028a2 TOP: Factoring Polynomials
KEY: multiple variables

45 ANS: 3

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

$$C \approx 78.3$$

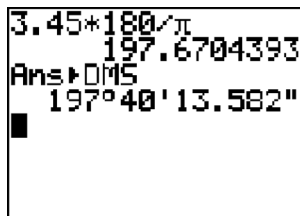
PTS: 2 REF: 081006a2 TOP: Law of Sines - The Ambiguous Case

46 ANS: 4

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

PTS: 2 REF: fall0922a2 TOP: Arc Length KEY: arc length

47 ANS:



Calculator display showing the calculation of an angle in degrees, minutes, and seconds:

$$3.45 \times \frac{180}{\pi} \approx 197.6704393$$

Ans: DMS
197°40'13.582"

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

PTS: 2 REF: fall0931a2 TOP: Radian Measure
KEY: degrees

48 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

TOP: Determining Trigonometric Functions

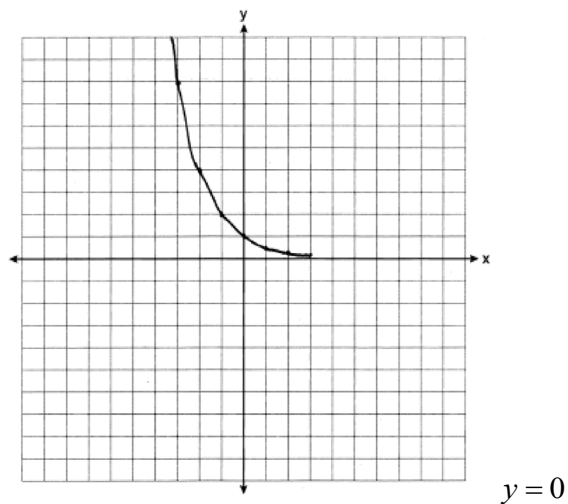
49 ANS: 2

PTS: 2

REF: 081024a2

TOP: Conjugates of Complex Numbers

50 ANS:



PTS: 2

REF: 061031a2

TOP: Graphing Exponential Functions

51 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

TOP: Absolute Value Inequalities

KEY: graph

52 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

TOP: Using the Discriminant

KEY: determine equation given nature of roots

53 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 TOP: Trigonometric Equations

KEY: basic

54 ANS:

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

PTS: 2 REF: 061034a2 TOP: Using Trigonometry to Find Area

KEY: parallelograms

55 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 TOP: Logarithmic Equations

KEY: advanced

56 ANS: 1 PTS: 2 REF: 061019a2 TOP: Imaginary Numbers

57 ANS:

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

PTS: 2 REF: 061036a2 TOP: Binomial Probability

KEY: at least or at most

58 ANS: 1

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

PTS: 2 REF: fall0919a2 TOP: Binomial Expansions

59 ANS: 1 PTS: 2 REF: fall0914a2 TOP: Negative and Fractional Exponents

60 ANS: 1 PTS: 2 REF: 061025a2 TOP: Sigma Notation

61 ANS: 3

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

PTS: 2 REF: 081009a2 TOP: Quadratic Formula

62 ANS: 3

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

PTS: 2 REF: 081026a2 TOP: Graphing Trigonometric Functions

KEY: recognize

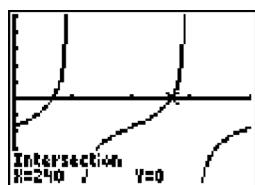
63 ANS: 1

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

PTS: 2 REF: 081002a2 TOP: Radian Measure

KEY: radians

64 ANS: 1



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

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

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

$$\theta = 60, 240$$

PTS: 2 REF: fall0903a2 TOP: Trigonometric Equations

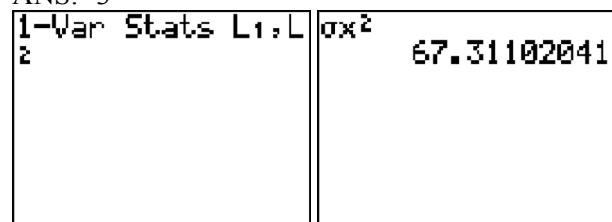
KEY: basic

65 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 TOP: Rationalizing Denominators

66 ANS: 3



PTS: 2 REF: fall0924a2 TOP: Dispersion KEY: variance

67 ANS: 3 PTS: 2 REF: 061022a2 TOP: Domain and Range

68 ANS: 3

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

PTS: 2 REF: 061006a2 TOP: Square Roots of Negative Numbers

69 ANS:

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

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

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

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

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

PTS: 4 REF: 081037a2 TOP: Angle Sum and Difference Identities

KEY: evaluating

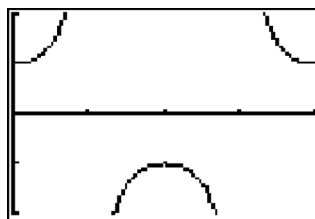
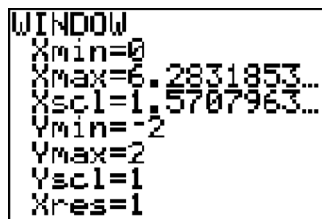
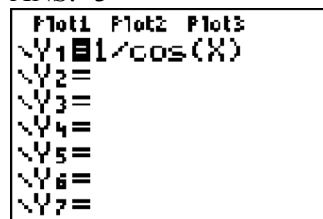
70 ANS: 3

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

PTS: 2 REF: 081021a2 TOP: Using Trigonometry to Find Area

KEY: parallelograms

71 ANS: 3



PTS: 2 REF: 061020a2 TOP: Graphing Trigonometric Functions

72 ANS: 4

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

PTS: 2 REF: fall0917a2 TOP: Factoring Polynomials

KEY: single variable

73 ANS: 3

PTS: 2

REF: fall0923a2

TOP: Domain and Range

KEY: real domain

74 ANS: 3

PTS: 2

REF: fall0910a2

TOP: Angle Sum and Difference Identities

KEY: simplifying

75 ANS: 4

PTS: 2

REF: fall0925a2

TOP: Permutations

76 ANS: 4

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

PTS: 2 REF: 081016a2 TOP: Using the Discriminant

KEY: determine nature of roots given equation

77 ANS: 2 PTS: 2 REF: 061021a2 TOP: Correlation Coefficient

78 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 TOP: Rationalizing Denominators

79 ANS: 1 PTS: 2 REF: 081022a2

TOP: Transformations with Functions and Relations

80 ANS: 3 PTS: 2 REF: 081027a2 TOP: Inverse of Functions

KEY: equations

81 ANS: 1 PTS: 2 REF: 061004a2 TOP: Identifying the Equation of a Graph

82 ANS: 4

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

PTS: 2 REF: 061027a2 TOP: Properties of Graphs of Trigonometric Functions

KEY: period

83 ANS: 2 PTS: 2 REF: 061011a2 TOP: Fractional Exponents as Radicals

84 ANS: 2 PTS: 2 REF: 081010a2 TOP: Trigonometric Ratios

85 ANS: 2

$$8^2 = 64$$

PTS: 2 REF: fall0909a2 TOP: Evaluating Logarithmic Expressions

86 ANS: 2

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

PTS: 2 REF: fall0907a2 TOP: Using Trigonometry to Find Area

KEY: basic

87 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 TOP: Exponential Equations

KEY: common base not shown

88 ANS: 3

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

PTS: 2 REF: 061003a2 TOP: Negative and Fractional Exponents

89 ANS:

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

PTS: 2 REF: 061038a2 TOP: Permutations

90 ANS: 4

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

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

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

PTS: 2 REF: fall0927a2 TOP: Functional Notation

91 ANS: 4 PTS: 2 REF: fall0908a2 TOP: Defining Functions

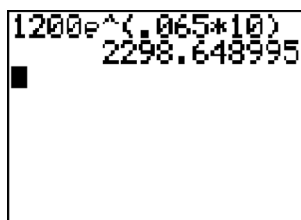
KEY: graphs

92 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 TOP: Defining Functions

93 ANS:



1200e^(.065*10)
2298.648995

2,298.65.

PTS: 2 REF: fall0932a2 TOP: Evaluating Exponential Expressions

94 ANS: 3 PTS: 2 REF: 061007a2

TOP: Differentiating Permutations and Combinations

95 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: 2 REF: 061039a2 TOP: Law of Cosines

KEY: advanced

96 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 TOP: Complex Fractions

97 ANS:

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

PTS: 2 REF: 081033a2 TOP: Writing Equations of Circles

98 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 TOP: Negative Exponents

99 ANS: 3 PTS: 2 REF: 081007a2 TOP: Using Inverse Trigonometric Functions

KEY: basic

100 ANS: 1

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

PTS: 2 REF: 081004a2 TOP: Imaginary Numbers

101 ANS: 2 PTS: 2 REF: fall0926a2

TOP: Transformations with Functions and Relations

102 ANS: 1

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

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

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

PTS: 2 REF: 061023a2 TOP: Trigonometric Ratios

103 ANS:

$$-3, -5, -8, -12$$

PTS: 2 REF: fall0934a2 TOP: Recursive Sequences

104 ANS: 4

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

PTS: 2 REF: 061008a2 TOP: Factoring Polynomials
KEY: single variable

105 ANS: 3 PTS: 2 REF: fall0913a2 TOP: Graphing Trigonometric Functions

106 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 TOP: Equations of Circles

107 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 TOP: Operations with Polynomials

108 ANS: 4 PTS: 2 REF: 061005a2 TOP: Solving Polynomial Equations

109 ANS:

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

PTS: 2 REF: fall0929a2 TOP: Writing Equations of Circles

110 ANS: 2 PTS: 2 REF: 081003a2 TOP: Domain and Range

111 ANS:

101.43, 12. $r^2 = 25^2 + 85^2 - 2(25)(85)\cos 125.$
 $r^2 \approx 10287.7$
 $r \approx 101.43$

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

$$x \approx 12$$

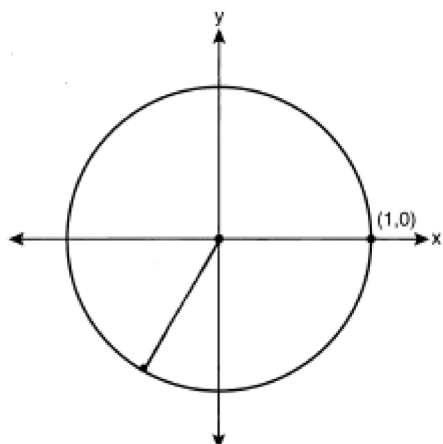
PTS: 6 REF: fall0939a2 TOP: Vectors

112 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 TOP: Properties of Logarithms

113 ANS:



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

PTS: 2 REF: 061033a2 TOP: Unit Circle

114 ANS: 1

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

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

PTS: 2 REF: 061017a2 TOP: Quadratic Inequalities

KEY: two variables

115 ANS: 4 PTS: 2 REF: 061026a2 TOP: Sequences

116 ANS:

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

PTS: 4 REF: fall0938a2 TOP: Power Regression

117 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

TOP: Logarithmic Equations

KEY: basic