JEFFERSON MATH PROJECT
REGENTS BY TYPE

The NY Algebra 2/Trigonometry Regents Exams
Fall 2009-August 2010
(Answer Key)

www.jmap.org

Dear Sir

I have to acknolege the reciept 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.

Algebra 2/Trigonometry Multiple Choice Regents Exam Questions
Answer Section

1 ANS: 2   PTS: 2   REF: fall0926a2
   TOP: Transformations with Functions and Relations
2 ANS: 1

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

   PTS: 2   REF: 081004a2   TOP: Imaginary Numbers
3 ANS: 1   PTS: 2   REF: 081022a2
   TOP: Transformations with Functions and Relations
4 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
5 ANS: 4
   $s = \theta r = 2 \cdot 4 = 8$

   PTS: 2   REF: fall0922a2   TOP: Arc Length   KEY: arc length
6 ANS: 1   PTS: 2   REF: 061025a2   TOP: Sigma Notation
7 ANS: 2   PTS: 2   REF: 081024a2   TOP: Conjugates of Complex Numbers
8 ANS: 1

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

   PTS: 2   REF: 081002a2   TOP: Radian Measure
   KEY: radians
9 ANS: 2   PTS: 2   REF: 081010a2   TOP: Trigonometric Ratios
10 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
11 ANS: 1   PTS: 2   REF: 061018a2   TOP: Solving Radicals
   KEY: extraneous solutions
12 ANS: 3

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

$2 \times 12 = 24$

   PTS: 2   REF: fall0911a2   TOP: Sigma Notation
   KEY: basic

13 ANS: 3

```
1-Var Stats L1,L  σx²
2                     67.31102041
```

PTS: 2   REF: fall0924a2   TOP: Dispersion   KEY: variance
14 ANS: 1   PTS: 2   REF: 061013a2   TOP: Defining Functions
15 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
16 ANS: 4   PTS: 2   REF: 061026a2   TOP: Sequences
17 ANS: 3

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

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

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

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

$$x = -3 \; x = -1$$

PTS: 2   REF: 061015a2   TOP: Exponential Equations
KEY: common base shown
18 ANS: 3   PTS: 2   REF: fall0910a2   TOP: Angle Sum and Difference Identities
KEY: simplifying
19 ANS: 4   PTS: 2   REF: 061005a2   TOP: Solving Polynomial Equations
20 ANS: 2   PTS: 2   REF: 061021a2   TOP: Correlation Coefficient
21 ANS: 3   PTS: 2   REF: 061007a2
TOP: Differentiating Permutations and Combinations
22 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
23 ANS: 4

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

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

24 ANS: 1

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

PTS: 2   REF: fall0919a2   TOP: Binomial Expansions

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

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

27 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

28 ANS: 2

$_{15}C_8 = 6,435$
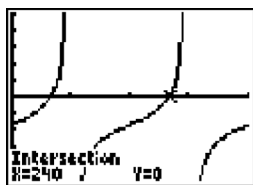
PTS: 2   REF: 081012a2   TOP: Combinations

29 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

30 ANS: 3

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

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

31 ANS: 1

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

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

$$K \approx 33°33'$$

PTS: 2   REF: 061023a2   TOP: Trigonometric Ratios

32 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

33 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

34 ANS: 4   PTS: 2   REF: fall0908a2   TOP: Defining Functions
KEY: graphs

35 ANS: 2

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

PTS: 2   REF: 061002a2   TOP: Radian Measure
KEY: degrees

36 ANS: 3

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

PTS: 2   REF: 081013a2   TOP: Normal Distributions
KEY: predict

37 ANS: 3

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

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

38 ANS: 3   PTS: 2   REF: fall0923a2   TOP: Domain and Range
    KEY: real domain
39 ANS: 3   PTS: 2   REF: 061022a2   TOP: Domain and Range
40 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
41 ANS: 4

$$7^2 = 3^2 + 5^2 - 2(3)(5)\cos A$$
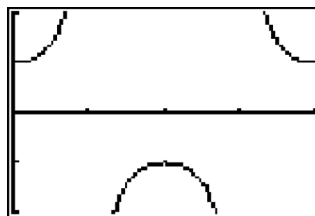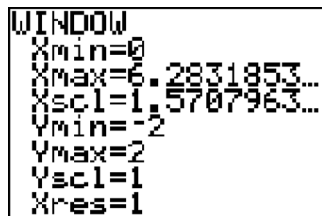
$$49 = 34 - 30\cos A$$

$$15 = -30\cos A$$
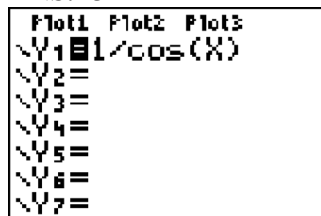
$$-\frac{1}{2} = \cos A$$

$$120 = \cos A$$

    PTS: 2   REF: 081017a2   TOP: Law of Sines
    KEY: angle, without calculator
42 ANS: 3

    PTS: 2   REF: 061020a2   TOP: Graphing Trigonometric Functions
43 ANS: 4

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

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

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

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

$$3x = 4$$

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

    PTS: 2   REF: 081008a2   TOP: Exponential Equations
    KEY: common base not shown
44 ANS: 3   PTS: 2   REF: 081007a2   TOP: Using Inverse Trigonometric Functions
    KEY: basic

45 ANS: 2

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

PTS: 2   REF: fall0916a2   TOP: Graphing Logarithmic Functions

46 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

47 ANS: 3

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

$\quad C \approx 78.3$

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

48 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

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

50 ANS: 3

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

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

51 ANS: 1

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

PTS: 2   REF: 061012a2   TOP: Rationalizing Denominators

52 ANS: 2

$8^2 = 64$

PTS: 2   REF: fall0909a2   TOP: Evaluating Logarithmic Expressions

53 ANS: 1

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

PTS: 2   REF: 061010a2   TOP: Properties of Logarithms

54 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

55 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

56 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

57 ANS: 3

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

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

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

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

58 ANS: 3   PTS: 2   REF: 081027a2   TOP: Inverse of Functions
KEY: equations

59 ANS: 4   PTS: 2   REF: 081005a2   TOP: Unit Circle
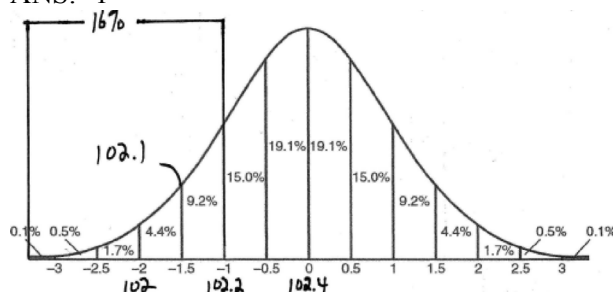
60 ANS: 2

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

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

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

PTS: 2   REF: 061016a2   TOP: Equations of Circles

61 ANS: 1

> PTS: 2   REF: fall0915a2   TOP: Normal Distributions
> KEY: interval

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

63 ANS: 1

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

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

> PTS: 2   REF: 061017a2   TOP: Quadratic Inequalities
> KEY: two variables

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

65 ANS: 3

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

> PTS: 2   REF: 081019a2   TOP: Rationalizing Denominators
> KEY: index = 2

66 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

67 ANS: 1

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

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

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

> PTS: 2   REF: fall0905a2   TOP: Absolute Value Inequalities
> KEY: graph

68 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

69 ANS: 4   PTS: 2   REF: fall0925a2   TOP: Permutations

70 ANS: 2

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

PTS: 2   REF: 081018a2   TOP: Negative Exponents

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

72 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

73 ANS: 2

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

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

74 ANS: 1

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

$$10 = x + 2(1)$$
$$8 = x$$

PTS: 2   REF: 081014a2   TOP: Sequences

75 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

76 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

77 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

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

79 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

80 ANS: 4
Students entering the library are more likely to spend more time studying, creating bias.

PTS: 2   REF: fall0904a2   TOP: Analysis of Data

81 ANS: 3
Cofunctions tangent and cotangent are complementary

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

Algebra 2/Trigonometry 2 Point Regents Exam Questions
Answer Section

1   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

2   ANS:

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

PTS: 2   REF: 081031a2   TOP: Exponential Regression

3   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

4   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

5   ANS:

```
9 nCr 2*20 nCr 3
             41040
```

41,040.

PTS: 2   REF: fall0935a2   TOP: Combinations

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   TOP: Complex Fractions

7 ANS:

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

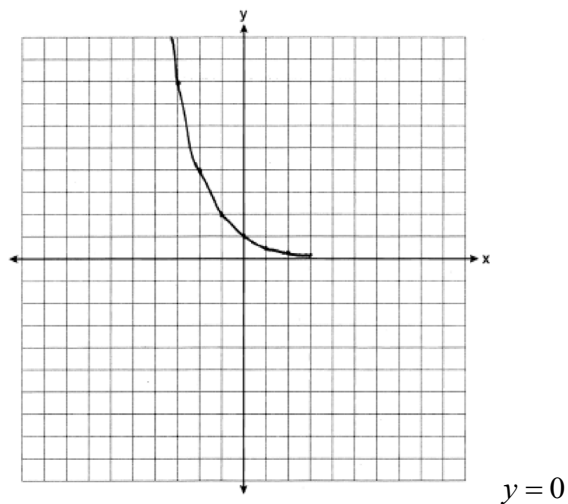PTS: 2 REF: fall0928a2 TOP: Rationalizing Denominators

8 ANS:

197º40'. $3.45 \times \dfrac{180}{\pi} \approx 197º40'$.

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

9 ANS:

$y = 0$

PTS: 2 REF: 061031a2 TOP: Graphing Exponential Functions

10 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

11 ANS:

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

PTS: 2 REF: 081029a2 TOP: Sigma Notation

12 ANS:

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

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

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

$$4 \neq 2$$

PTS: 2   REF: fall0930a2   TOP: Solving Rationals
KEY: rational solutions

13 ANS:
7.4

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

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

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

15 ANS:
$-3, -5, -8, -12$

PTS: 2   REF: fall0934a2   TOP: Recursive Sequences

16 ANS:
Sum $\dfrac{-b}{a} = -\dfrac{11}{5}$. Product $\dfrac{c}{a} = -\dfrac{3}{5}$

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

17 ANS:
45, 225 $2\tan C - 3 = 3\tan C - 4$
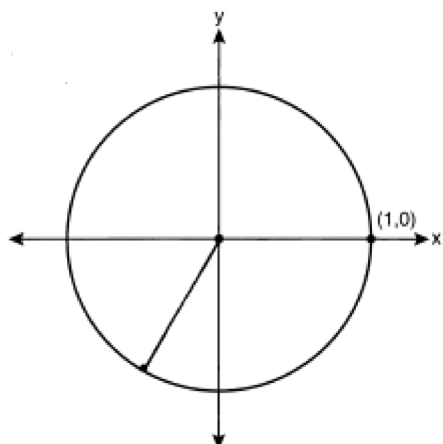
$$1 = \tan C$$

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

$$C = 45, 225$$

PTS: 2   REF: 081032a2   TOP: Trigonometric Equations
KEY: basic

18 ANS:

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

PTS: 2 REF: 061033a2 TOP: Unit Circle

19 ANS:

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

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

20 ANS:

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

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

21 ANS:

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

PTS: 2 REF: fall0933a2 TOP: Determining Trigonometric Functions

22 ANS:

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

PTS: 2 REF: 081035a2 TOP: Permutations

23 ANS:

```
1200e^(.065*10)
        2298.648995
■
```

2,298.65.

PTS: 2 REF: fall0932a2 TOP: Evaluating Exponential Expressions

24 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

Algebra 2/Trigonometry 4 Point Regents Exam Questions
Answer Section

1 ANS:

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

PTS: 4 REF: 061038a2 TOP: Permutations

2 ANS:

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

PTS: 4 REF: 081038a2 TOP: Binomial Probability
KEY: at least or at most

3 ANS:

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

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

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

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

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

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

4 ANS:

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

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

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

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

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

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

$\theta = 60, 300$

PTS: 4 REF: 061037a2 TOP: Trigonometric Equations
KEY: double angle identities

5 ANS:

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

PTS: 4   REF: 061036a2   TOP: Binomial Probability
KEY: at least or at most

6 ANS:

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

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

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

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

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

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

PTS: 4   REF: fall0937a2   TOP: Solving Polynomial Equations

7 ANS:

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

PTS: 4   REF: fall0938a2   TOP: Power Regression

8 ANS:

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

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

$x^2 - 6x = -2$

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

$(x-3)^2 = 7$

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

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

PTS: 4   REF: fall0936a2   TOP: Completing the Square

9 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

Algebra 2/Trigonometry 6 Point Regents Exam Questions
Answer Section

1 ANS:

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

$$C \approx 33$$

PTS: 6   REF: 061039a2   TOP: Law of Cosines
KEY: advanced

2 ANS:

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

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

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

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

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

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

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

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

PTS: 6   REF: 081039a2   TOP: Logarithmic Equations
KEY: basic

3 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