JEFFERSON MATH PROJECT REGENTS BY DATE

The NY Integrated Algebra Regents Exams
Fall, 2007-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.

fall07ia
Answer Section

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

2 ANS: 3 PTS: 2 REF: fall0702ia STA: A.S.23
TOP: Theoretical Probability KEY: mutually exclusive events

3 ANS: 3

$$\frac{(2x^3)(8x^5)}{4x^6} = \frac{16x^8}{4x^6} = 4x^2$$

PTS: 2 REF: fall0703ia STA: A.A.12 TOP: Division of Powers

4 ANS: 4 PTS: 2 REF: fall0704ia STA: A.A.29
TOP: Set Theory

5 ANS: 3 PTS: 2 REF: fall0705ia STA: A.N.1
TOP: Identifying Properties

6 ANS: 3 PTS: 2 REF: fall0706ia STA: A.A.19
TOP: Factoring the Difference of Perfect Squares

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

PTS: 2 REF: fall0707ia STA: A.S.14 TOP: Analysis of Data

8 ANS: 3

$$5x + 2y = 48$$

$$3x + 2y = 32$$

$$2x = 16$$

$$x = 8$$

PTS: 2 REF: fall0708ia STA: A.A.7 TOP: Writing Linear Systems

9 ANS: 2
The median score, 10, is the vertical line in the center of the box.

PTS: 2 REF: fall0709ia STA: A.S.5 TOP: Box-and-Whisker Plots

10 ANS: 3 PTS: 2 REF: fall0710ia STA: A.A.31
TOP: Set Theory

11 ANS: 1
$30^2 + 40^2 = c^2$. 30, 40, 50 is a multiple of 3, 4, 5.

$$2500 = c^2$$

$$50 = c$$

PTS: 2 REF: fall0711ia STA: A.A.45 TOP: Pythagorean Theorem

12 ANS: 4

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

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

13 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 $y = -\frac{3}{2}x + 3$.

PTS: 2 REF: fall0713ia STA: A.A.35 TOP: Writing Linear Equations

14 ANS: 2

The two values are shoe size and height.

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

15 ANS: 4 PTS: 2 REF: fall0715ia STA: A.A.5 TOP: Modeling Inequalities

16 ANS: 3

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

PTS: 2 REF: fall0716ia STA: A.A.33 TOP: Slope

17 ANS: 4 PTS: 2 REF: fall0717ia STA: A.G.4 TOP: Families of Functions

18 ANS: 2

$\frac{9x^4 - 27x^6}{3x^3} = \frac{9x^4(1-3x^2)}{3x^3} = 3x(1-3x^2)$

PTS: 2 REF: fall0718ia STA: A.A.14 TOP: Rational Expressions

19 ANS: 3

$35000(1-0.05)^4 \approx 28507.72$

PTS: 2 REF: fall0719ia STA: A.A.9 TOP: Exponential Functions

20 ANS: 2

The slope of the inequality is $-\frac{1}{2}$.

PTS: 2 REF: fall0720ia STA: A.G.6 TOP: Linear Inequalities

21 ANS: 1

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

PTS: 2 REF: fall0721ia STA: A.A.42 TOP: Trigonometric Ratios

22 ANS: 4

The transformation is a reflection in the x-axis.

PTS: 2 REF: fall0722ia STA: A.G.5 TOP: Graphing Absolute Value Functions

23 ANS: 1 PTS: 2 REF: fall0723ia STA: A.M.3
TOP: Error

24 ANS: 1

$$-2x + 5 > 17$$
$$-2x > 12$$
$$x < -6$$

PTS: 2 REF: fall0724ia STA: A.A.21 TOP: Interpreting Solutions

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

26 ANS: 4

$$w(w+5) = 36$$
$$w^2 + 5w - 36 = 0$$

PTS: 2 REF: fall0726ia STA: A.A.5 TOP: Modeling Equations

27 ANS: 4

$$\frac{(d \times 3) + (2 \times 2d)}{2 \times 3} = \frac{3d + 4d}{6} = \frac{7d}{6}$$

PTS: 2 REF: fall0727ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

28 ANS: 1 PTS: 2 REF: fall0728ia STA: A.A.15
TOP: Undefined Rationals

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

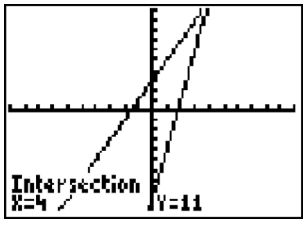
30 ANS: 4 PTS: 2 REF: fall0730ia STA: A.G.3
TOP: Defining Functions

31 ANS:
$30\sqrt{2}$. $5\sqrt{72} = 5\sqrt{36}\sqrt{2} = 30\sqrt{2}$

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

32 ANS:

4. $3 + 2g = 5g - 9$



$$12 = 3g$$
$$g = 4$$

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

33 ANS:
33.4. Serena needs 24 $(9+6+9)$ feet of fencing to surround the rectangular portion of the garden. The length of the fencing needed for the semicircular portion of the garden is $\frac{1}{2}\pi d = 3\pi \approx 9.4$ feet.

PTS: 2 REF: fall0733ia STA: A.G.1 TOP: Compositions of Polygons and Circles

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

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

35 ANS:
7. $15x + 22 \geq 120$

$x \geq 6.5\overline{3}$

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

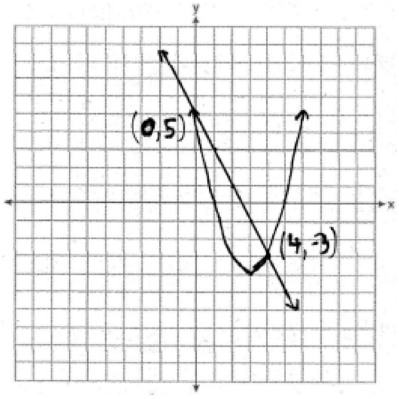
36 ANS:
(S,S), (S,K), **(S,D)**, (K,S), (K,K), **(K,D)**, **(D,S)**, **(D,K)**, (D,D), $\frac{4}{9}$

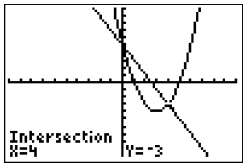
PTS: 3 REF: fall0736ia STA: A.S.19 TOP: Sample Space

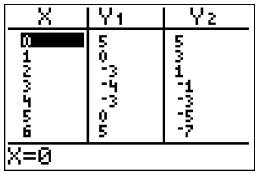
37 ANS:
225000, 175000, the median better represents the value since it is closer to more values than the mean.

PTS: 4 REF: fall0737ia STA: A.S.4
TOP: Frequency Histograms, Bar Graphs and Tables

38 ANS:

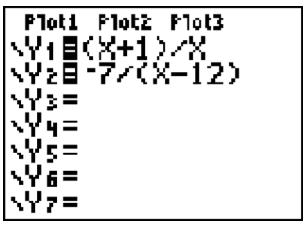


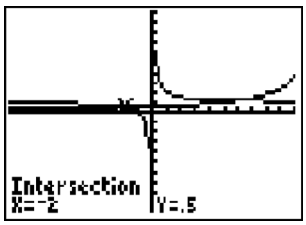




PTS: 4 REF: fall0738ia STA: A.G.9 TOP: Quadratic-Linear Systems

39 ANS:





6,–2. $\dfrac{x+1}{x} = \dfrac{-7}{x-12}$

$(x+1)(x-12) = -7x$

$x^2 - 11x - 12 = -7x$

$x^2 - 4x - 12 = 0$

$(x-6)(x+2) = 0$

$x = 6 \text{ or } -2$

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

0608ia
Answer Section

1 ANS: 1 PTS: 2 REF: 060801ia STA: A.G.4
TOP: Families of Functions

2 ANS: 4

$P(G \text{ or } W) = \frac{4}{8}, P(G \text{ or } B) = \frac{3}{8}, P(Y \text{ or } B) = \frac{4}{8}, P(Y \text{ or } G) = \frac{5}{8}$

PTS: 2 REF: 060802ia STA: A.S.22 TOP: Theoretical Probability

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

PTS: 2 REF: 060803ia STA: A.S.3 TOP: Analysis of Data

4 ANS: 1 PTS: 2 REF: 060804ia STA: A.A.19
TOP: Factoring the Difference of Perfect Squares

5 ANS: 4 PTS: 2 REF: 060805ia STA: A.S.12
TOP: Scatter Plots

6 ANS: 2

$3c + 4m = 12.50$

$3c + 2m = 8.50$

$2m = 4.00$

$m = 2.00$

PTS: 2 REF: 060806ia STA: A.A.7 TOP: Writing Linear Systems

7 ANS: 1 PTS: 2 REF: 060807ia STA: A.A.13
TOP: Multiplication of Polynomials

8 ANS: 3 PTS: 2 REF: 060808ia STA: A.N.8
TOP: Permutations

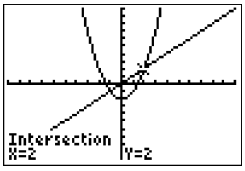
9 ANS: 2

$1.5^3 = 3.375$

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

10 ANS: 4

$x^2 - 2 = x$ Since $y = x$, the solutions are $(2,2)$ and $(-1,-1)$.



$x^2 - x - 2 = 0$

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

$x = 2 \text{ or } -1$

PTS: 2 REF: 060810ia STA: A.A.11 TOP: Quadratic-Linear Systems

11 ANS: 1 PTS: 2 REF: 060811ia STA: A.G.10
TOP: Identifying the Vertex of a Quadratic Given Graph

12 ANS: 3

$b = 42 - r \quad r = 2b + 3$

$r = 2b + 3 \quad r = 2(42 - r) + 3$

$r = 84 - 2r + 3$

$3r = 87$

$r = 29$

PTS: 2 REF: 060812ia STA: A.A.7 TOP: Writing Linear Systems

13 ANS: 4

$\frac{2^6}{2^1} = 2^5$

PTS: 2 REF: 060813ia STA: A.A.12 TOP: Division of Powers

14 ANS: 1
The slope of both is –4.

PTS: 2 REF: 060814ia STA: A.A.38 TOP: Parallel and Perpendicular Lines

15 ANS: 4

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

PTS: 2 REF: 060815ia STA: A.A.18 TOP: Multiplication and Division of Rationals

16 ANS: 2

$\sin A = \frac{8}{12}$

$A \approx 42$

PTS: 2 REF: 060816ia STA: A.A.43 TOP: Using Trigonometry to Find an Angle

17 ANS: 3 PTS: 2 REF: 060817ia STA: A.A.15
TOP: Undefined Rationals

18 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 $\{-1, 0, 2, 3, 4\}$.

PTS: 2 REF: 060818ia STA: A.A.30 TOP: Set Theory

19 ANS: 3
The other situations are quantitative.

PTS: 2 REF: 060819ia STA: A.S.1 TOP: Analysis of Data

20 ANS: 3

$m = \dfrac{1-(-4)}{-6-4} = -\dfrac{1}{2}$

PTS: 2 REF: 060820ia STA: A.A.33 TOP: Slope

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

22 ANS: 3

$25 - 18 = 7$

PTS: 2 REF: 060822ia STA: A.S.9
TOP: Frequency Histograms, Bar Graphs and Tables

23 ANS: 4

$25(x-3) = 25x - 75$

PTS: 2 REF: 060823ia STA: A.A.1 TOP: Expressions

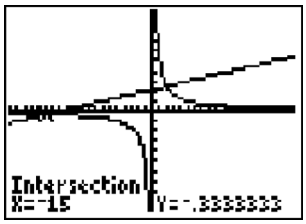
24 ANS: 2

$\dfrac{2x^2 - 12x}{x-6} = \dfrac{2x(x-6)}{x-6} = 2x$

PTS: 2 REF: 060824ia STA: A.A.14 TOP: Rational Expressions

25 ANS: 3 PTS: 2 REF: 060825ia STA: A.A.45
TOP: Pythagorean Theorem

26 ANS: 4



$\dfrac{5}{x} = \dfrac{x+13}{6}$

$x^2 + 13x = 30$

$x^2 + 13x - 30 = 0$

$(x+15)(x-2) = 0$

$x = -15 \text{ or } 2$

PTS: 2 REF: 060826ia STA: A.A.26 TOP: Solving Rationals

27 ANS: 4

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

PTS: 2 REF: 060827ia STA: A.G.2 TOP: Surface Area

28 ANS: 1

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

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

29 ANS: 4 PTS: 2 REF: 060829ia STA: A.G.5
TOP: Graphing Quadratic Functions

30 ANS: 2 PTS: 2 REF: 060830ia STA: A.A.9
TOP: Exponential Functions

31 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

32 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

33 ANS:

$0 \le t \le 40$

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

34 ANS:

$10 + 2d \ge 75$, 33. $10 + 2d \ge 75$

$d \ge 32.5$

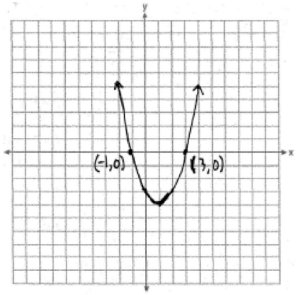
PTS: 3 REF: 060834ia STA: A.A.6 TOP: Modeling Inequalities

35 ANS:

$\frac{1}{6}$, 16.67%, \$13.50. $\frac{18-15}{18} = \frac{1}{6}$. $18 \times 0.75 = 13.5$

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

36 ANS:



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

37 ANS:
$w(w+15) = 54$, 3, 18. $w(w+15) = 54$

$$w^2 + 15w - 54 = 0$$
$$(w+18)(w-3) = 0$$
$$w = 3$$

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

38 ANS:
618.45, 613.44, 0.008. $21.7 \times 28.5 = 618.45$. $21.6 \times 28.4 = 613.44$. $\left|\frac{618.45 - 613.44}{613.44}\right| \approx 0.008$. An error of less than 1% would seem to be insignificant.

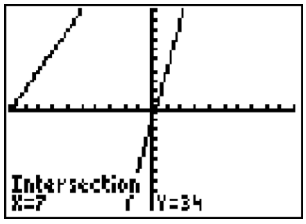
PTS: 4 REF: 060838ia STA: A.M.3 TOP: Error

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

PTS: 4 REF: 060839ia STA: A.S.4
TOP: Frequency Histograms, Bar Graphs and Tables

0808ia
Answer Section

1 ANS: 4



$5p - 1 = 2p + 20$

$3p = 21$

$p = 7$

PTS: 2 REF: 080801ia STA: A.A.22 TOP: Solving Equations

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

3 ANS: 1 PTS: 2 REF: 080803ia STA: A.A.4
TOP: Modeling Inequalities

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

PTS: 2 REF: 080804ia STA: A.S.4 TOP: Central Tendency

5 ANS: 4

$-4x + 2 > 10$

$-4x > 8$

$x < -2$

PTS: 2 REF: 080805ia STA: A.A.21 TOP: Interpreting Solutions

6 ANS: 2

$2x^2 + 10x - 12 = 2(x^2 + 5x - 6) = 2(x + 6)(x - 1)$

PTS: 2 REF: 080806ia STA: A.A.20 TOP: Factoring Polynomials

7 ANS: 2

If the car can travel 75 miles on 4 gallons, it can travel 300 miles on 16 gallons. $\frac{75}{4} = \frac{x}{16}$.

$x = 300$

PTS: 2 REF: 080807ia STA: A.G.4 TOP: Graphing Linear Functions

8 ANS: 3

$3ax + b = c$

$3ax = c - b$

$x = \frac{c-b}{3a}$

PTS: 2 REF: 080808ia STA: A.A.23 TOP: Transforming Formulas

9 ANS: 4

$16^2 + b^2 = 34^2$

$b^2 = 900$

$b = 30$

PTS: 2 REF: 080809ia STA: A.A.45 TOP: Pythagorean Theorem

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

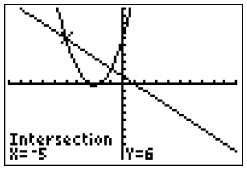
11 ANS: 2

$s + o = 126.\ s + 2s = 126$

$o = 2s \qquad s = 42$

PTS: 2 REF: 080811ia STA: A.A.7 TOP: Writing Linear Systems

12 ANS: 2



$x^2 + 5x + 6 = -x + 1.\ y = -x + 1$

$x^2 + 6x + 5 = 0 \qquad = -(-5) + 1$

$(x+5)(x+1) = 0 \qquad = 6$

$x = -5 \text{ or } -1$

PTS: 2 REF: 080812ia STA: A.A.11 TOP: Quadratic-Linear Systems

13 ANS: 1 PTS: 2 REF: 080813ia STA: A.G.10
TOP: Identifying the Vertex of a Quadratic Given Graph

14 ANS: 3

0.75 hours = 45 minutes. $\frac{120}{1} = \frac{x}{45}$

$x = 5400$

PTS: 2 REF: 080814ia STA: A.M.1 TOP: Using Rate

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

16 ANS: 1

$${}_4P_4 = 4 \times 3 \times 2 \times 1 = 24$$

PTS: 2 REF: 080816ia STA: A.N.8 TOP: Permutations

17 ANS: 2

$$l(l-5) = 24$$

$$l^2 - 5l - 24 = 0$$

$$(l-8)(l+3) = 0$$

$$l = 8$$

PTS: 2 REF: 080817ia STA: A.A.8 TOP: Geometric Applications of Quadratics

18 ANS: 3

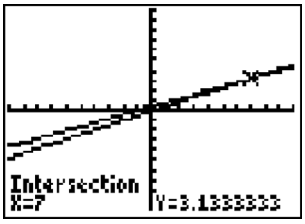
The value of the third quartile is the last vertical line of the box.

PTS: 2 REF: 080818ia STA: A.S.6 TOP: Box-and-Whisker Plots

19 ANS: 3 PTS: 2 REF: 080819ia STA: A.A.13
TOP: Addition and Subtraction of Polynomials KEY: subtraction

20 ANS: 4

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



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

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

$$6x + 5 = 7x - 2$$

$$x = 7$$

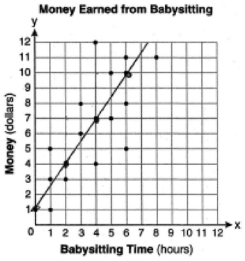
PTS: 2 REF: 080820ia STA: A.A.25
TOP: Solving Equations with Fractional Expressions

21 ANS: 4

$$\frac{25x-125}{x^2-25} = \frac{25(x-5)}{(x+5)(x-5)} = \frac{25}{x+5}$$

PTS: 2 REF: 080821ia STA: A.A.16 TOP: Rational Expressions
KEY: a > 0

22 ANS: 4



PTS: 2 REF: 080822ia STA: A.S.8 TOP: Scatter Plots

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

24 ANS: 1 PTS: 2 REF: 080824ia STA: A.A.43
TOP: Using Trigonometry to Find an Angle

25 ANS: 4 PTS: 2 REF: 080825ia STA: A.A.40
TOP: Systems of Linear Inequalities

26 ANS: 1

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

PTS: 2 REF: 080826ia STA: A.A.18 TOP: Multiplication and Division of Rationals

27 ANS: 4 PTS: 2 REF: 080827ia STA: A.A.12
TOP: Powers of Powers

28 ANS: 1

$$\left|\frac{289-282}{289}\right|\approx 0.024$$

PTS: 2 REF: 080828ia STA: A.M.3 TOP: Error

29 ANS: 3

$\sin A=\frac{10}{16}$ $B=180-(90=38.7)=51.3.$ A 90º angle is not acute.

$A\approx 38.7$

PTS: 2 REF: 080829ia STA: A.A.43 TOP: Using Trigonometry to Find an Angle

30 ANS: 2

The events are not mutually exclusive: P(prime) = $\frac{3}{6}$, P(even) = $\frac{3}{6}$, P(prime AND even) = $\frac{1}{6}$

P(prime OR even) = $\frac{3}{6}+\frac{3}{6}-\frac{1}{6}=\frac{5}{6}$

PTS: 2 REF: 080830ia STA: A.S.23 TOP: Theoretical Probability
KEY: not mutually exclusive events

31 ANS:

111.25. $\frac{\text{distance}}{\text{time}} = \frac{89}{0.8} = 111.25$

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

32 ANS:

$\frac{3}{8}$. $P(s_1 < 4) \times P(s_2 = \text{back}) = \frac{3}{4} \times \frac{1}{2} = \frac{3}{8}$

PTS: 2 REF: 080832ia STA: A.S.23 TOP: Theoretical Probability
KEY: independent events

33 ANS:

{1,2,4,5,9,10,12}

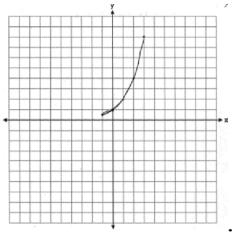
PTS: 2 REF: 080833ia STA: A.A.30 TOP: Set Theory

34 ANS:

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

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

35 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

36 ANS:

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

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

$b = 2$

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

37 ANS:

$m = 50¢, p = 15¢$. $3m + 2p = 1.80$. $9m + 6p = 5.40$. $4(.50) + 6p = 2.90$

$4m + 6p = 2.90$ $4m + 6p = 2.90$ $6p = .90$

$5m = 2.50$ $p = \$0.15$

$m = \$0.50$

PTS: 3 REF: 080837ia STA: A.A.7 TOP: Writing Linear Systems

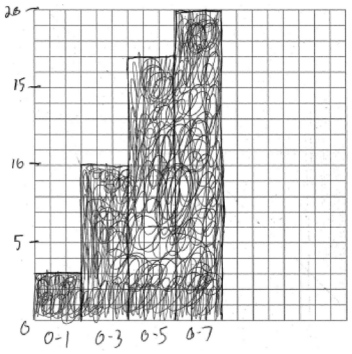
38 ANS:

Number of Days Outside

Interval	Tally	Frequency
0–1	III	3
2–3	~~IIII~~ II	7
4–5	~~IIII~~ II	7
6–7	III	3

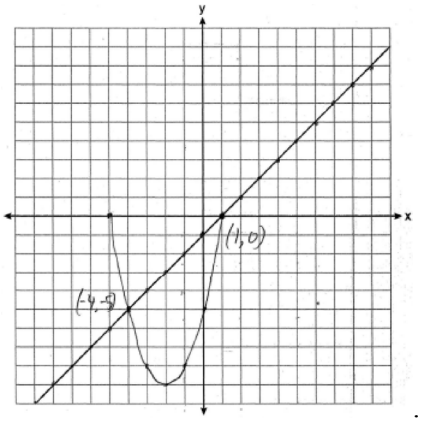
Number of Days Outside

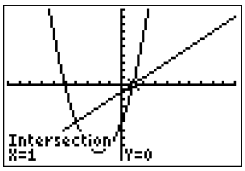
Interval	Cumulative Frequency
0–1	3
0–3	10
0–5	17
0–7	20



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

39 ANS:





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

0109ia
Answer Section

1 ANS: 3

$$F = \frac{9}{5}C + 32 = \frac{9}{5}(15) + 32 = 59$$

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

2 ANS: 4

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

PTS: 2 REF: 010902ia STA: A.M.1 TOP: Speed

3 ANS: 4

$$P(O) = \frac{3}{6}, P(E) = \frac{3}{6}, P(< 6) = \frac{5}{6}, P(> 4) = \frac{2}{6}$$

PTS: 2 REF: 010903ia STA: A.S.22 TOP: Theoretical Probability

4 ANS: 1

$$0.07m + 19 \le 29.50$$

$$0.07m \le 10.50$$

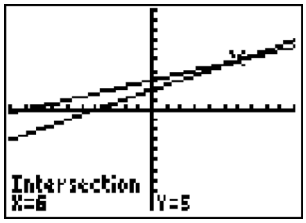
$$m \le 150$$

PTS: 2 REF: 010904ia STA: A.A.6 TOP: Modeling Inequalities

5 ANS: 1 PTS: 2 REF: 010905ia STA: A.G.4
TOP: Families of Functions

6 ANS: 3

$$\frac{k+4}{2} = \frac{k+9}{3}$$



$$3(k+4) = 2(k+9)$$

$$3k + 12 = 2k + 18$$

$$k = 6$$

PTS: 2 REF: 010906ia STA: A.A.26 TOP: Solving Rationals

7 ANS: 4

The mean is $80.\overline{6}$, the median is 84.5 and the mode is 87.

PTS: 2 REF: 010907ia STA: A.S.4 TOP: Central Tendency

8 ANS: 4 PTS: 2 REF: 010908ia STA: A.A.9
TOP: Exponential Functions

9 ANS: 2 PTS: 2 REF: 010909ia STA: A.A.19
TOP: Factoring the Difference of Perfect Squares
10 ANS: 3 PTS: 2 REF: 010910ia STA: A.A.35
TOP: Writing Linear Equations
11 ANS: 2

$$P = 2l + 2w$$

$$P - 2l = 2w$$

$$\frac{P - 2l}{2} = w$$

PTS: 2 REF: 010911ia STA: A.A.23 TOP: Transforming Formulas
12 ANS: 3

$$\cos 30 = \frac{x}{24}$$

$$x \approx 21$$

PTS: 2 REF: 010912ia STA: A.A.44 TOP: Using Trigonometry to Find a Side
13 ANS: 2

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

PTS: 2 REF: 010913ia STA: A.A.33 TOP: Slope
14 ANS: 3

$$x^2 - 10x + 21 = 0$$

$$(x-7)(x-3) = 0$$

$$x = 7 \quad x = 3$$

PTS: 2 REF: 010914ia STA: A.A.28 TOP: Roots of Quadratics
15 ANS: 2 PTS: 2 REF: 010915ia STA: A.A.5
TOP: Modeling Equations
16 ANS: 2 PTS: 2 REF: 010916ia STA: A.G.10
TOP: Identifying the Vertex of a Quadratic Given Graph
17 ANS: 3 PTS: 2 REF: 010917ia STA: A.A.29
TOP: Set Theory
18 ANS: 1

$$\frac{2}{x} - 3 = \frac{26}{x}$$

$$-3 = \frac{24}{x}$$

$$x = -8$$

PTS: 2 REF: 010918ia STA: A.A.25 TOP: Solving Rationals

19 ANS: 2

$\sin U = \dfrac{\text{opposite}}{\text{hypotenuse}} = \dfrac{15}{17}$

PTS: 2 REF: 010919ia STA: A.A.42 TOP: Trigonometric Ratios

20 ANS: 3

$\sqrt{72} = \sqrt{36}\sqrt{2} = 6\sqrt{2}$

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

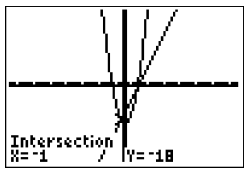
21 ANS: 2

$\dfrac{6}{5x} - \dfrac{2}{3x} = \dfrac{18x - 10x}{15x^2} = \dfrac{8x}{15x^2} = \dfrac{8}{15x}$

PTS: 2 REF: 010921ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

22 ANS: 2

$x^2 - x - 20 = 3x - 15$. $y = 3x - 15$.



$x^2 - 4x - 6 = 0$ $= 3(-1) - 15$

$(x = 5)(x + 1) = 0$ $= -18$

$x = 5 \text{ or } -1$

PTS: 2 REF: 010922ia STA: A.A.11 TOP: Quadratic-Linear Systems

23 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.

PTS: 2 REF: 010923ia STA: A.S.3 TOP: Analysis of Data

24 ANS: 4

$A = lw = (3w - 7)(w) = 3w^2 - 7w$

PTS: 2 REF: 010924ia STA: A.A.1 TOP: Expressions

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

26 ANS: 1

The slope of $y = 3 - 2x$ is –2. Using $m = -\dfrac{A}{B}$, the slope of $4x + 2y = 5$ is $-\dfrac{4}{2} = -2$.

PTS: 2 REF: 010926ia STA: A.A.38 TOP: Parallel and Perpendicular Lines

27 ANS: 4 PTS: 2 REF: 010927ia STA: A.N.4
TOP: Operations with Scientific Notation

28 ANS: 1

$\frac{1}{8} \times \frac{1}{8} = \frac{1}{64}$

PTS: 2 REF: 010928ia STA: A.S.23 TOP: Theoretical Probability
KEY: independent events

29 ANS: 4 PTS: 2 REF: 010929ia STA: A.S.6
TOP: Box-and-Whisker Plots

30 ANS: 4 PTS: 2 REF: 010930ia STA: A.G.3
TOP: Defining Functions

31 ANS:

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

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

32 ANS:

$\frac{3k^2m^6}{4}$

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

33 ANS:

$d = 6.25h$, 250. $d = 6.25(40) = 250$

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

34 ANS:

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

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

35 ANS:

$\frac{3}{4x-8} \cdot \frac{3x+6}{4x+12} \div \frac{x^2-4}{x+3} = \frac{3(x+2)}{4(x+3)} \cdot \frac{x+3}{(x+2)(x-2)} = \frac{3}{4(x-2)}$

PTS: 3 REF: 010935ia STA: A.A.18 TOP: Multiplication and Division of Rationals

36 ANS:

$\frac{38}{\pi}$, 2. $V = \pi r^2 h$. $\frac{36}{\left(\frac{38}{\pi}\right)} \approx 2.97$. Three cans will not fit. The maximum number is 2.

$342 = \pi\left(\frac{6}{2}\right)^2 h$

$\frac{342}{9\pi} = h$

$\frac{38}{\pi} = h$

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

37 ANS:

$(-2, 5)$. $3x + 2y = 4$ $12x + 8y = 16$. $3x + 2y = 4$

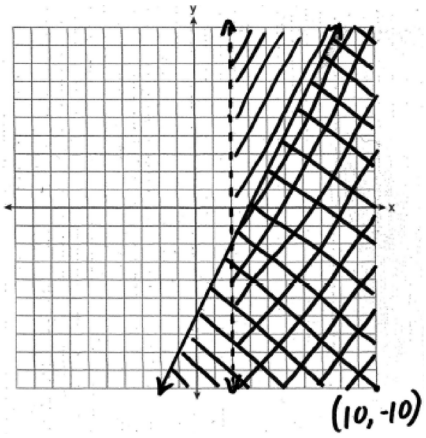
$4x + 3y = 7$ $12x + 9y = 21$ $3x + 2(5) = 4$

$y = 5$ $3x = -6$

$x = -2$

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

38 ANS:



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

39 ANS:

(H,F,M), (H,F,J), (H,F,S), (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

0609ia
Answer Section

1 ANS: 4

$$\frac{5}{45} = \frac{8}{x}$$

$$5x = 360$$

$$x = 72$$

PTS: 2 REF: 060901ia STA: A.M.1 TOP: Speed

2 ANS: 4

$$x^2 - 7x + 6 = 0$$

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

$$x = 6 \quad x = 1$$

PTS: 2 REF: 060902ia STA: A.A.28 TOP: Roots of Quadratics

3 ANS: 1 PTS: 2 REF: 060903ia STA: A.A.12
TOP: Division of Powers

4 ANS: 2 PTS: 2 REF: 060904ia STA: A.A.1
TOP: Expressions

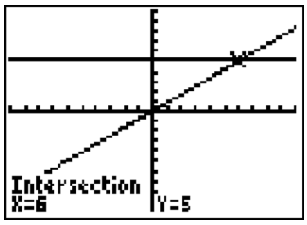
5 ANS: 3
The other situations are quantitative.

PTS: 2 REF: 060905ia STA: A.S.1 TOP: Analysis of Data

6 ANS: 4 PTS: 2 REF: 060906ia STA: A.A.4
TOP: Modeling Inequalities

7 ANS: 1

$$\frac{(2x \times 6) + (3 \times x)}{3 \times 6} = 5$$



$$\frac{12x + 3x}{18} = 5$$

$$15x = 90$$

$$x = 6$$

PTS: 2 REF: 060907ia STA: A.A.25
TOP: Solving Equations with Fractional Expressions

8 ANS: 2 PTS: 2 REF: 060908ia STA: A.S.21
TOP: Empirical Probability

9 ANS: 3

$3^2 + 5^2 = x^2$

$34 = x^2$

$\sqrt{34} = x$

PTS: 2 REF: 060909ia STA: A.A.45 TOP: Pythagorean Theorem

10 ANS: 2

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

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

11 ANS: 4

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

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

12 ANS: 2

$L + S = 47$

$L - S = 15$

$2L = 62$

$L = 31$

PTS: 2 REF: 060912ia STA: A.A.7 TOP: Writing Linear Systems

13 ANS: 3

$a + ar = b + r$

$a(1 + r) = b + r$

$a = \frac{b + r}{1 + r}$

PTS: 2 REF: 060913ia STA: A.A.23 TOP: Transforming Formulas

14 ANS: 1

$\frac{4}{3}x + 5 < 17$

$\frac{4}{3}x < 12$

$4x < 36$

$x < 9$

PTS: 2 REF: 060914ia STA: A.A.21 TOP: Interpreting Solutions

15 ANS: 3

The value of the upper quartile is the last vertical line of the box.

PTS: 2 REF: 060915ia STA: A.S.6 TOP: Box-and-Whisker Plots

16 ANS: 4 PTS: 2 REF: 060916ia STA: A.A.15
TOP: Undefined Rationals

17 ANS: 1

$so = f + 60 \;\; j = 2f - 50 \;\; se = 3f. \;\; f + (f + 60) + (2f - 50) + 3f = 1424$

$$7f + 10 = 1424$$

$$f = 202$$

PTS: 2 REF: 060917ia STA: A.A.7 TOP: Writing Linear Systems

18 ANS: 1

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

PTS: 2 REF: 060918ia STA: A.A.41
TOP: Identifying the Vertex of a Quadratic Given Equation

19 ANS: 3 PTS: 2 REF: 060919ia STA: A.G.3
TOP: Defining Functions

20 ANS: 1 PTS: 2 REF: 060920ia STA: A.G.6
TOP: Linear Inequalities

21 ANS: 2

$$\frac{x^2 - 2x - 15}{x^2 + 3x} = \frac{(x - 5)(x + 3)}{x(x + 3)} = \frac{x - 5}{x}$$

PTS: 2 REF: 060921ia STA: A.A.16 TOP: Rational Expressions
KEY: a > 0

22 ANS: 1

$y = mx + b$

$-6 = (-3)(4) + b$

$b = 6$

PTS: 2 REF: 060922ia STA: A.A.34 TOP: Writing Linear Equations

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

24 ANS: 3 PTS: 2 REF: 060924ia STA: A.G.8
TOP: Solving Quadratics by Graphing

25 ANS: 2

$x + 2y = 9$

$x - y = 3$

$3y = 6$

$y = 2$

PTS: 2 REF: 060925ia STA: A.A.10 TOP: Solving Linear Systems

26 ANS: 3 PTS: 2 REF: 060926ia STA: A.N.1
TOP: Properties of Reals

27 ANS: 4 PTS: 2 REF: 060927ia STA: A.N.4
TOP: Operations with Scientific Notation

28 ANS: 2
The volume of the cube using Ezra's measurements is 8 (2^3). The actual volume is 9.261 (2.1^3). The relative error is $\left|\frac{9.261-8}{9.261}\right| \approx 0.14$.

PTS: 2 REF: 060928ia STA: A.M.3 TOP: Error

29 ANS: 2
$\frac{6}{4a}-\frac{2}{3a}=\frac{18a-8a}{12a^2}=\frac{10a}{12a^2}=\frac{5}{6a}$

PTS: 2 REF: 060929ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

30 ANS: 4 PTS: 2 REF: 060930ia STA: A.A.29
TOP: Set Theory

31 ANS:
60. ${}_5P_3 = 60$

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

32 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

33 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

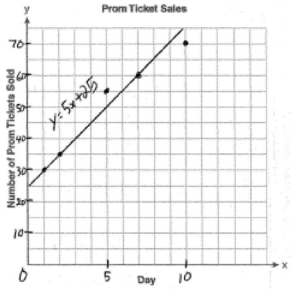
34 ANS:
56. If the circumference of circle *O* is 16ð inches, the diameter, $\overline{AD}$, is 16 inches and the length of $\overline{BC}$ is 12 inches $\frac{3}{4}\times 16$. The area of trapezoid *ABCD* is $\frac{1}{2}\times 4(12+16)=56$.

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

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

PTS: 3 REF: 060935ia STA: A.A.9 TOP: Exponential Functions

36 ANS:



PTS: 3 REF: 060936ia STA: A.S.8 TOP: Scatter Plots

37 ANS:

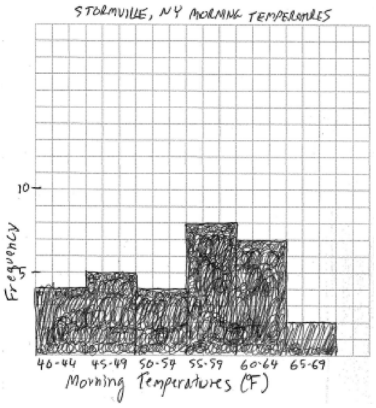
39, 63. $\tan 52 = \frac{50}{x}$. $\sin 52 = \frac{50}{x}$

$x \approx 39$ $x \approx 63$

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

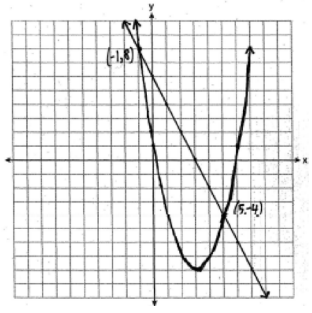
38 ANS:

Interval	Tally	Frequency
40–44	IIII	4
45–49	|||||	5
50–54	IIII	4
55–59	||||| III	8
60–64	||||| II	7
65–69	II	2



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

39 ANS:



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

0809ia
Answer Section

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

2 ANS: 1 PTS: 2 REF: 080902ia STA: A.A.19
TOP: Factoring the Difference of Perfect Squares

3 ANS: 4 PTS: 2 REF: 080903ia STA: A.A.12
TOP: Multiplication of Powers

4 ANS: 1

$$13.95 + 0.49s \le 50.00$$
$$0.49s \le 36.05$$
$$s \le 73.57$$

PTS: 2 REF: 080904ia STA: A.A.6 TOP: Modeling Inequalities

5 ANS: 3

$$(3-1) \times 2 \times 3 = 12$$

PTS: 2 REF: 080905ia STA: A.N.7 TOP: Conditional Probability

6 ANS: 1

$$8^2 + 15^2 = c^2$$
$$c^2 = 289$$
$$c = 17$$

PTS: 2 REF: 080906ia STA: A.A.45 TOP: Pythagorean Theorem

7 ANS: 3 PTS: 2 REF: 080907ia STA: A.S.20
TOP: Theoretical Probability

8 ANS: 3
The number of correct answers on a test causes the test score.

PTS: 2 REF: 080908ia STA: A.S.13 TOP: Analysis of Data

9 ANS: 2

$$\frac{3}{5}(x+2) = x-4$$
$$3(x+2) = 5(x-4)$$
$$3x+6 = 5x-20$$
$$26 = 2x$$
$$x = 13$$

PTS: 2 REF: 080909ia STA: A.A.25
TOP: Solving Equations with Fractional Expressions

10 ANS: 4
Surveying persons leaving a football game about a sports budget contains the most bias.

PTS: 2 REF: 080910ia STA: A.S.3 TOP: Analysis of Data

11 ANS: 1 PTS: 2 REF: 080911ia STA: A.A.36
TOP: Parallel and Perpendicular Lines

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

PTS: 2 REF: 080912ia STA: A.A.30 TOP: Set Theory

13 ANS: 4
$-2(x-5) < 4$

$-2x + 10 < 4$

$-2x < -6$

$x > 3$

PTS: 2 REF: 080913ia STA: A.A.21 TOP: Interpreting Solutions

14 ANS: 2
$\tan 32 = \frac{x}{25}$

$x \approx 15.6$

PTS: 2 REF: 080914ia STA: A.A.44 TOP: Using Trigonometry to Find a Side

15 ANS: 1
$m = \frac{4-(-4)}{-5-15} = -\frac{2}{5}$

PTS: 2 REF: 080915ia STA: A.A.33 TOP: Slope

16 ANS: 2 PTS: 2 REF: 080916ia STA: A.G.8
TOP: Solving Quadratics by Graphing

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

PTS: 2 REF: 080917ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

18 ANS: 1
$x^2 + 7x + 10 = 0$

$(x+5)(x+2) = 0$

$x = -5 \text{ or } -2$

PTS: 2 REF: 080918ia STA: A.A.15 TOP: Undefined Rationals

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

PTS: 2 REF: 080919ia STA: A.G.3 TOP: Defining Functions

20 ANS: 1
$x - 2y = 1$

$x + 4y = 7$

$-6y = -6$

$y = 1$

PTS: 2 REF: 080920ia STA: A.A.10 TOP: Solving Linear Systems

21 ANS: 3
$x^2 - 6x = 0$

$x(x - 6) = 0$

$x = 0 \; x = 6$

PTS: 2 REF: 080921ia STA: A.A.27 TOP: Solving Quadratics by Factoring

22 ANS: 2
$5\sqrt{20} = 5\sqrt{4}\sqrt{5} = 10\sqrt{5}$

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

23 ANS: 3
$|-5(5) + 12| = |-13| = 13$

PTS: 2 REF: 080923ia STA: A.N.6 TOP: Evaluating Expressions

24 ANS: 1 PTS: 2 REF: 080924ia STA: A.G.1
TOP: Compositions of Polygons and Circles

25 ANS: 3 PTS: 2 REF: 080925ia STA: A.G.4
TOP: Identifying the Equation of a Graph

26 ANS: 2
$\left|\frac{149.6 - 174.2}{149.6}\right| \approx 0.1644$

PTS: 2 REF: 080926ia STA: A.M.3 TOP: Error

27 ANS: 4
$y = mx + b$

$-1 = (2)(3) + b$

$b = -7$

PTS: 2 REF: 080927ia STA: A.A.34 TOP: Writing Linear Equations

28 ANS: 4

Let x = youngest brother and $x + 4$ = oldest brother. $3x-(x+4)=48.$

$$2x-4=48$$

$$x=26$$

PTS: 2 REF: 080928ia STA: A.A.6 TOP: Modeling Equations

29 ANS: 3

$500(1+0.06)^3 \approx 596$

PTS: 2 REF: 080929ia STA: A.A.9 TOP: Exponential Functions

30 ANS: 2 PTS: 2 REF: 080930ia STA: A.S.17

TOP: Scatter Plots

31 ANS:

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

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

32 ANS:

5,112. $(12\times30\times16)-(6\times12\times9)=5112$

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

33 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

34 ANS:

(–2, 11). $x=\frac{-b}{2a}=\frac{-(-8)}{2(-2)}=-2$

$y=-2(-2)^2-8(-2)+3=11$

PTS: 3 REF: 080934ia STA: A.A.41

TOP: Identifying the Vertex of a Quadratic Given Equation

35 ANS:

30.4%; no, 23.3%. $\frac{7.50-5.75}{5.75}=30.4\%.$ $\frac{7.50-5.75}{7.50}=23.3\%$

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

36 ANS:

Greg's rate of 5.5 is faster than Dave's rate of 5.3. $\frac{\text{distance}}{\text{time}}=\frac{11}{2}=5.5.$ $\frac{16}{3}=5.\overline{3}$

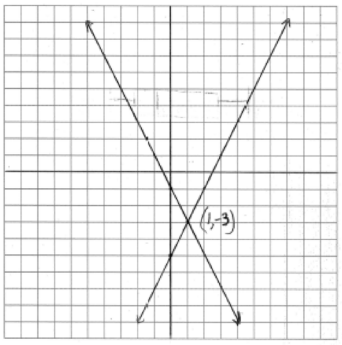
PTS: 3 REF: 080936ia STA: A.M.1 TOP: Speed

37 ANS:

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

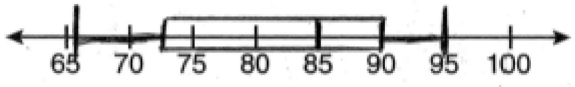
PTS: 4 REF: 080937ia STA: A.A.18 TOP: Multiplication and Division of Rationals

38 ANS:



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

39 ANS:



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

0110ia
Answer Section

1 ANS: 1 PTS: 2 REF: 011001ia STA: A.S.6
TOP: Box-and-Whisker Plots
2 ANS: 2 PTS: 2 REF: 011002ia STA: A.S.20
TOP: Theoretical Probability
3 ANS: 1
$1P + 2C = 5$

$1P + 4C = 6$

$2C = 1$

$C = 0.5$

PTS: 2 REF: 011003ia STA: A.A.7 TOP: Writing Linear Systems
4 ANS: 1 PTS: 2 REF: 011004ia STA: A.A.31
TOP: Set Theory
5 ANS: 2 PTS: 2 REF: 011005ia STA: A.A.5
TOP: Modeling Inequalities
6 ANS: 2
$R = 0.5^{d-1}$

PTS: 2 REF: 011006ia STA: A.A.9 TOP: Exponential Functions
7 ANS: 4
$A(-3,4)$ and $B(5,8)$. $m = \frac{4-8}{-3-5} = \frac{-4}{-8} = \frac{1}{2}$

PTS: 2 REF: 011007ia STA: A.A.33 TOP: Slope
8 ANS: 3
$\cos A = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{15}{17}$

PTS: 2 REF: 011008ia STA: A.A.42 TOP: Trigonometric Ratios
9 ANS: 2
Debbie failed to distribute the 3 properly.

PTS: 2 REF: 011009ia STA: A.A.22 TOP: Solving Equations
10 ANS: 1
$-|a-b| = -|7-(-3)| = -|-10| = -10$

PTS: 2 REF: 011010ia STA: A.N.6 TOP: Evaluating Expressions
11 ANS: 3
$\frac{12x^3 - 6x^2 + 2x}{2x} = \frac{2x(6x^2 - 3x + 1)}{2x} = 6x^2 - 3x + 1$

PTS: 2 REF: 011011ia STA: A.A.14 TOP: Rational Expressions

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

13 ANS: 3

$m = \frac{7-3}{-3-3} = \frac{4}{-6} = -\frac{2}{3}$ $y = mx + b$

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

$3 = -2 + b$

$5 = b$

PTS: 2 REF: 011013ia STA: A.A.35 TOP: Writing Linear Equations

14 ANS: 3
Frequency is not a variable.

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

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

16 ANS: 4 PTS: 2 REF: 011016ia STA: A.A.23
TOP: Transforming Formulas

17 ANS: 3 PTS: 2 REF: 011017ia STA: A.G.5
TOP: Graphing Absolute Value Functions

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

PTS: 2 REF: 011018ia STA: A.G.3 TOP: Defining Functions

19 ANS: 2 PTS: 2 REF: 011019ia STA: A.S.12
TOP: Scatter Plots

20 ANS: 4 PTS: 2 REF: 011020ia STA: A.A.12
TOP: Multiplication of Powers

21 ANS: 1

$4y - 2x = 0$

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

$-4 + 4 = 0$

PTS: 2 REF: 011021ia STA: A.A.39 TOP: Identifying Points on a Line

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

23 ANS: 2 PTS: 2 REF: 011023ia STA: A.A.40
TOP: Systems of Linear Inequalities

24 ANS: 4

$6\sqrt{50} + 6\sqrt{2} = 6\sqrt{25}\sqrt{2} + 6\sqrt{2} = 30\sqrt{2} + 6\sqrt{2} = 36\sqrt{2}$

PTS: 2 REF: 011024ia STA: A.N.3 TOP: Operations with Radicals
KEY: addition

25 ANS: 4 PTS: 2 REF: 011025ia STA: A.A.17
TOP: Addition and Subtraction of Rationals

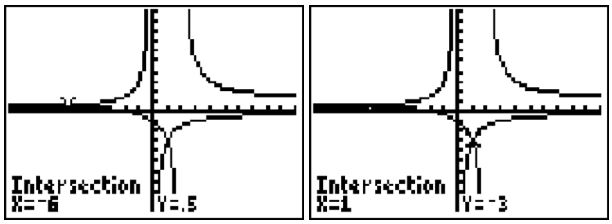
26 ANS: 1

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

PTS: 2 REF: 011026ia STA: A.A.38 TOP: Parallel and Perpendicular Lines

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

28 ANS: 4



$$\frac{x+2}{x-2} = \frac{-3}{x}$$

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

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

$$x^2 + 5x - 6 = 0$$

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

$$x = -6 \text{ or } 1$$

PTS: 2 REF: 011028ia STA: A.A.26 TOP: Solving Rationals

29 ANS: 4

$\text{SA} = 2lw + 2hw + 2lh = 2(2)(3) + 2(4)(3) + 2(2)(4) = 52$

PTS: 2 REF: 011029ia STA: A.G.2 TOP: Surface Area

30 ANS: 3

The age of a child does not cause the number of siblings he has, or vice versa.

PTS: 2 REF: 011030ia STA: A.S.14 TOP: Analysis of Data

31 ANS:

16. 12 feet equals 4 yards. $4 \times 4 = 16$.

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

32 ANS:

53. $\sin A = \frac{16}{20}$

$A \approx 53$

PTS: 2 REF: 011032ia STA: A.A.43 TOP: Using Trigonometry to Find an Angle

33 ANS:

orchestra: $\frac{3}{26} > \frac{4}{36}$

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

34 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

35 ANS:

81.3, 80, both increase

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

36 ANS:

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

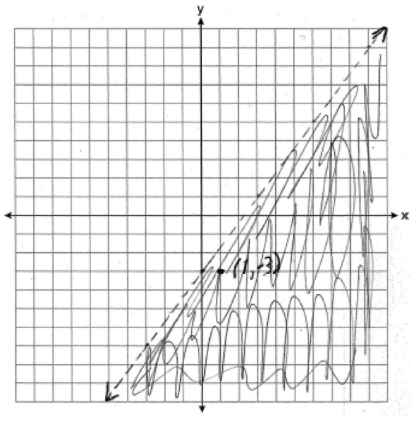
PTS: 3 REF: 011036ia STA: A.M.3 TOP: Error

37 ANS:

15,600,000, 4,368,000. $10 \times 10 \times 10 \times 26 \times 25 \times 24 = 15,600,000$. $10 \times 9 \times 8 \times 26 \times 25 \times 24 = 11,232,000$.
$15,600,000 - 11,232,000 = 4,368,000$.

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

38 ANS:



$(1,-3)$ is in the solution set. $4(1) - 3(-3) > 9$

$4 + 9 > 9$

PTS: 4 REF: 011038ia STA: A.G.6 TOP: Linear Inequalities

39 ANS:
6, 8, 10. Three consecutive even integers are x, $x+2$ and $x+4$. $(x+2)(x+4) = 10x+20$

$$x^2+6x+8 = 10x+20$$
$$x^2-4x-12 = 0$$
$$(x-6)(x+2) = 0$$
$$x = 6$$

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

0610ia
Answer Section

1 ANS: 4 PTS: 2 REF: 061001ia STA: A.A.30
TOP: Set Theory

2 ANS: 4

$5 \times 2 \times 3 = 30$

PTS: 2 REF: 061002ia STA: A.N.7 TOP: Multiplication Counting Principle

3 ANS: 3 PTS: 2 REF: 061003ia STA: A.A.13
TOP: Addition and Subtraction of Polynomials KEY: addition

4 ANS: 2

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

PTS: 2 REF: 061004ia STA: A.A.33 TOP: Slope

5 ANS: 1 PTS: 2 REF: 061005ia STA: A.G.10
TOP: Identifying the Vertex of a Quadratic Given Graph

6 ANS: 3

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

PTS: 2 REF: 061006ia STA: A.S.21 TOP: Experimental Probability

7 ANS: 3

2(1)+3=5

PTS: 2 REF: 061007ia STA: A.A.39 TOP: Linear Equations

8 ANS: 3

$\sqrt{72} - 3\sqrt{2} = \sqrt{36}\sqrt{2} - 3\sqrt{2} = 6\sqrt{2} - 3\sqrt{2} = 3\sqrt{2}$

PTS: 2 REF: 061008ia STA: A.N.3 TOP: Operations with Radicals
KEY: subtraction

9 ANS: 2

$\tan A = \frac{\text{opposite}}{\text{adjacent}} = \frac{14}{48}$

PTS: 2 REF: 061009ia STA: A.A.42 TOP: Trigonometric Ratios

10 ANS: 1 PTS: 2 REF: 061010ia STA: A.A.40
TOP: Systems of Linear Inequalities

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

12 ANS: 3

$c + 3d = 8 \quad c = 4d - 6$

$4d - 6 + 3d = 8 \quad c = 4(2) - 6$

$7d = 14 \quad c = 2$

$d = 2$

PTS: 2 REF: 061012ia STA: A.A.10 TOP: Solving Linear Systems

13 ANS: 4 PTS: 2 REF: 061013ia STA: A.G.3
TOP: Defining Functions

14 ANS: 3

$x^2 - 9 = 0$

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

$x = \pm 3$

PTS: 2 REF: 061014ia STA: A.A.15 TOP: Undefined Rationals

15 ANS: 2
$y - kx = 7$ may be rewritten as $y = kx + 7$

PTS: 2 REF: 061015ia STA: A.A.38 TOP: Parallel and Perpendicular Lines

16 ANS: 4 PTS: 2 REF: 061016ia STA: A.A.2
TOP: Expressions

17 ANS: 3 PTS: 2 REF: 061017ia STA: A.S.11
TOP: Quartiles and Percentiles

18 ANS: 4 PTS: 2 REF: 061018ia STA: A.A.12
TOP: Division of Powers

19 ANS: 3

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

$\frac{2x + 3(x+1)}{6} = x$

$5x + 3 = 6x$

$3 = x$

PTS: 2 REF: 061019ia STA: A.A.25
TOP: Solving Equations with Fractional Expressions

20 ANS: 1

$x^2 - 36 = 5x$

$x^2 - 5x - 36 = 0$

$(x - 9)(x + 4) = 0$

$x = 9$

PTS: 2 REF: 061020ia STA: A.A.8 TOP: Writing Quadratics

21 ANS: 1 PTS: 2 REF: 061021ia STA: A.A.29
TOP: Set Theory

22 ANS: 4 PTS: 2 REF: 061022ia STA: A.S.3
TOP: Analysis of Data

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

24 ANS: 1 PTS: 2 REF: 061024ia STA: A.A.17
TOP: Addition and Subtraction of Rationals

25 ANS: 4

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

PTS: 2 REF: 061025ia STA: A.M.1 TOP: Speed

26 ANS: 4

$${}_8P_3 = 336$$

PTS: 2 REF: 061026ia STA: A.N.8 TOP: Permutations

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

28 ANS: 4 PTS: 2 REF: 061028ia STA: A.G.6
TOP: Linear Inequalities

29 ANS: 2

$$A = lw + \frac{\pi r^2}{2} = 6 \cdot 5 + \frac{\pi \cdot 3^2}{2} \approx 44.1$$

PTS: 2 REF: 061029ia STA: A.G.1 TOP: Compositions of Polygons and Circles

30 ANS: 1

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

PTS: 2 REF: 061030ia STA: A.A.9 TOP: Exponential Functions

31 ANS:

$$\frac{600 - 592}{592} \approx 0.014$$

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

32 ANS:

$-6a + 42.$ distributive

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

33 ANS:

$\sin x = \frac{30}{50}$

$x = \sin^{-1}\frac{3}{5}$

$x \approx 37$

PTS: 2 REF: 061033ia STA: A.A.43 TOP: Using Trigonometry to Find an Angle

34 ANS:

$-12.\ 3\left(\frac{2}{3}x + 3 < -2x - 7\right)$

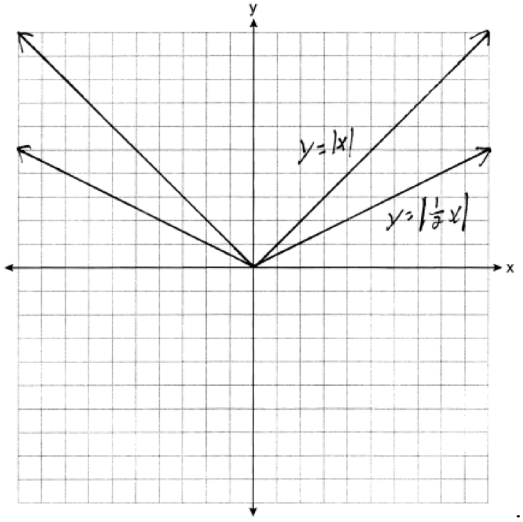
$x + 9 < -6x - 21$

$7x < -30$

$x < \frac{-30}{7}$

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

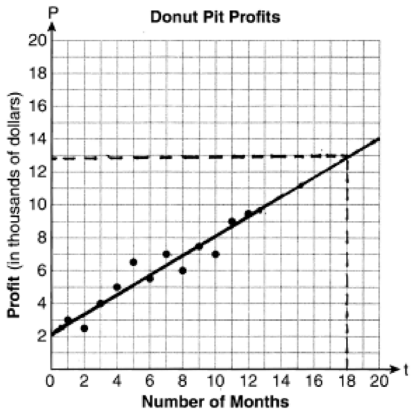
35 ANS:



. Graph becomes wider as the coefficient approaches 0.

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

36 ANS:



They will not reach their goal in 18 months.

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

37 ANS:

$$\frac{x^2+9x+14}{x^2-49} \div \frac{3x+6}{x^2+x-56} = \frac{(x+7)(x+2)}{(x+7)(x-7)} \cdot \frac{(x+8)(x-7)}{3(x+2)} = \frac{x+8}{3}$$

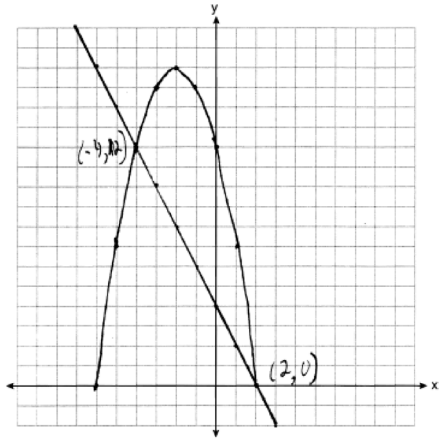
PTS: 4 REF: 061037ia STA: A.A.18 TOP: Multiplication and Division of Rationals

38 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

39 ANS:



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

0810ia
Answer Section

1 ANS: 3 PTS: 2 REF: 081001ia STA: A.S.7
TOP: Scatter Plots

2 ANS: 1

$$3(2m-1) \le 4m+7$$
$$6m-3 \le 4m+7$$
$$2m \le 10$$
$$m \le 5$$

PTS: 2 REF: 081002ia STA: A.A.24 TOP: Solving Inequalities

3 ANS: 2 PTS: 2 REF: 081003ia STA: A.A.31
TOP: Set Theory

4 ANS: 2

$$\sqrt{5^2+7^2} \approx 8.6$$

PTS: 2 REF: 081004ia STA: A.A.45 TOP: Pythagorean Theorem

5 ANS: 2

$A(-3,8)$ and $B(3,6)$. $m = \dfrac{8-6}{-3-3} = \dfrac{2}{-6} = -\dfrac{1}{3}$

PTS: 2 REF: 081005ia STA: A.A.33 TOP: Slope

6 ANS: 4

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

PTS: 2 REF: 081006ia STA: A.N.4 TOP: Operations with Scientific Notation

7 ANS: 2

Candidate B received 45%. $45\% \times 1860 = 837$

PTS: 2 REF: 081007ia STA: A.N.5 TOP: Percents

8 ANS: 3 PTS: 2 REF: 081008ia STA: A.A.19
TOP: Factoring the Difference of Perfect Squares

9 ANS: 3 PTS: 2 REF: 081009ia STA: A.A.30
TOP: Set Theory

10 ANS: 1

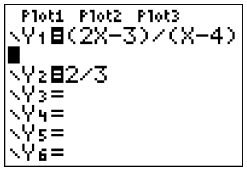
$2y - 2x = 10$ axis of symmetry: $x = \dfrac{-b}{2a} = \dfrac{-2}{2(1)} = -1$

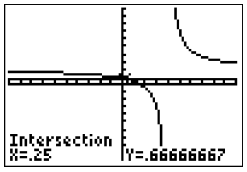
$$2y = 2x + 10$$
$$y = x + 5$$

PTS: 2 REF: 081010ia STA: A.G.9 TOP: Quadratic-Linear Systems

11 ANS: 4 PTS: 2 REF: 081011ia STA: A.A.5
TOP: Modeling Equations

12 ANS: 2





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

$$3(2x-3)=2(x-4)$$

$$6x-9=2x-8$$

$$4x=1$$

$$x=\frac{1}{4}$$

PTS: 2 REF: 081012ia STA: A.A.26 TOP: Solving Rationals

13 ANS: 4

$$5(x+4)=5x+20$$

PTS: 2 REF: 081013ia STA: A.A.1 TOP: Expressions

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

15 ANS: 1 PTS: 2 REF: 081015ia STA: A.G.5
TOP: Graphing Quadratic Functions

16 ANS: 4

$$2x-3y=9$$

$$2(0)-3(-3)=9$$

$$0+9=9$$

PTS: 2 REF: 081016ia STA: A.A.39 TOP: Identifying Points on a Line

17 ANS: 3 PTS: 2 REF: 081017a STA: A.S.14
TOP: Analysis of Data

18 ANS: 3

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

PTS: 2 REF: 081018ia STA: A.A.41
TOP: Identifying the Vertex of a Quadratic Given Equation

19 ANS: 2

$\text{shaded} = \text{whole} - \text{unshaded}$

$= \text{rectangle-triangle}$

$= lw - \frac{1}{2}bh$

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

$= 90 - 34.5$

$= 55.5$

PTS: 2 REF: 081019ia STA: A.G.1 TOP: Compositions of Polygons and Circles

20 ANS: 4

$\frac{2+3+0+1+3+2+4+0+2+3}{10} = \frac{20}{10} = 2 \quad \frac{x}{10} = 2 + 0.5$

$x = 25$

PTS: 2 REF: 081020ia STA: A.S.16 TOP: Average Known with Missing Data

21 ANS: 2

$2(x - 3y = -3)$

$2x + y = 8$

$2x - 6y = -6$

$7y = 14$

$y = 2$

PTS: 2 REF: 081021ia STA: A.A.10 TOP: Solving Linear Systems

22 ANS: 4 PTS: 2 REF: 081022ia STA: A.A.29
TOP: Set Theory

23 ANS: 2

$\left| \frac{55.42 - 50.27}{55.42} \right| \approx 0.093$

PTS: 2 REF: 081023ia STA: A.M.3 TOP: Error

24 ANS: 3

$P(S) \cdot P(M) = P(S \text{ and } M)$

$\frac{3}{5} \cdot P(M) = \frac{3}{10}$

$P(M) = \frac{1}{2}$

PTS: 2 REF: 081024ia STA: A.S.23 TOP: Theoretical Probability
KEY: independent events

25 ANS: 4 PTS: 2 REF: 081025ia STA: A.G.4
TOP: Families of Functions

26 ANS: 2

$$\tan B = \frac{\text{opposite}}{\text{adjacent}} = \frac{8}{15} = 0.5\overline{3}$$

PTS: 2 REF: 081026ia STA: A.A.42 TOP: Trigonometric Ratios

27 ANS: 3

$$\frac{2+x}{5x} - \frac{x-2}{5x} = \frac{2+x-x+2}{5x} = \frac{4}{5x}$$

PTS: 2 REF: 081027ia STA: A.A.17 TOP: Addition and Subtraction of Rationals

28 ANS: 3

$${}_6P_4 = 360$$

PTS: 2 REF: 081028ia STA: A.N.8 TOP: Permutations

29 ANS: 2

$$m = \frac{5-3}{8-1} = \frac{2}{7} \quad y - y_1 = m(x - x_i)$$

$$y - 5 = \frac{2}{7}(x - 8)$$

PTS: 2 REF: 081029ia STA: A.A.35 TOP: Writing Linear Equations

30 ANS: 1 PTS: 2 REF: 081030ia STA: A.A.3
TOP: Expressions

31 ANS:

$$3a^2b^2 - 6a \quad \frac{45a^4b^3 - 90a^3b}{15a^2b} = \frac{45a^4b^3}{15a^2b} - \frac{90a^3b}{15a^2b} = 3a^2b^2 - 6a$$

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

32 ANS:

2,160 $\quad \frac{1,200}{25} = \frac{x}{45}$

$$25x = 54,000$$

$$x = 2,160$$

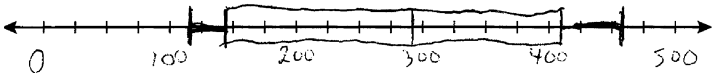
PTS: 2 REF: 081032ia STA: A.M.1 TOP: Using Rate

33 ANS:

$$-3\sqrt{48} = -3\sqrt{16}\sqrt{3} = -12\sqrt{3}$$

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

34 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

35 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

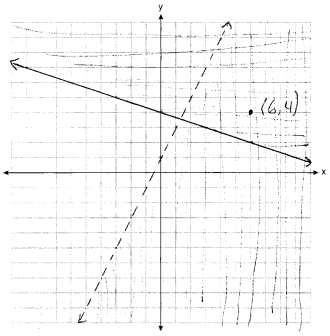
36 ANS:
$-15, 2$ $x^2 + 13x - 30 = 0$

$(x + 15)(x - 2) = 0$

$x = -15, 2$

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

37 ANS:



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

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

PTS: 4 REF: 081038ia STA: A.S.22 TOP: Theoretical Probability

39 ANS:
84, 71 $\sin 50 = \frac{x}{110}$ $\cos 50 = \frac{y}{110}$

$x \approx 84$ $y \approx 71$

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