August 2016 Answer Key

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(1) 1	(9) 3	(17) . . . . . 1 . . . . .
(2) 3	(10) 1	(18) . . . . . 1 . . . . .
(3) 4	(11) 4	(19) . . . . . 1 . . . . .
(4) 4	(12) 3	(20) . . . . . 2 . . . . .
(5) 2	(13) 3	(21) . . . . . 3 . . . . .
(6) 2	(14) 3	(22) . . . . . 4 . . . . .
(7) 1	(15) 4	(23) . . . . . 1 . . . . .
(8) 2	(16) 3	(24) . . . . . 2 . . . . .

Answer all 8 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [16]
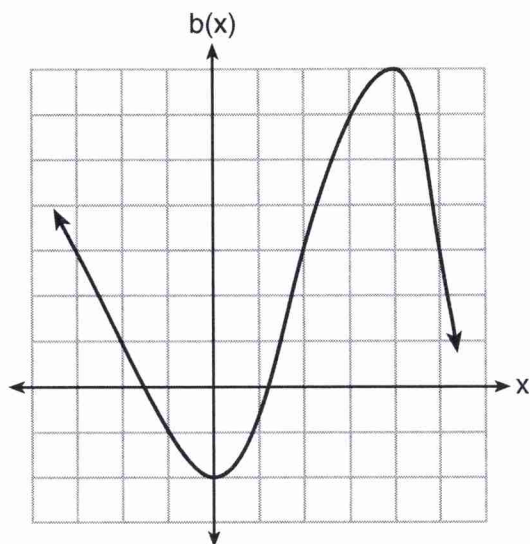
25 Graph the function $y = -\sqrt{x+3}$ on the set of axes below.

Table From Calculator

x	y
-3	0
-2	-1
1	-2
6	-3
13	-4

$y = -\sqrt{x+3}$
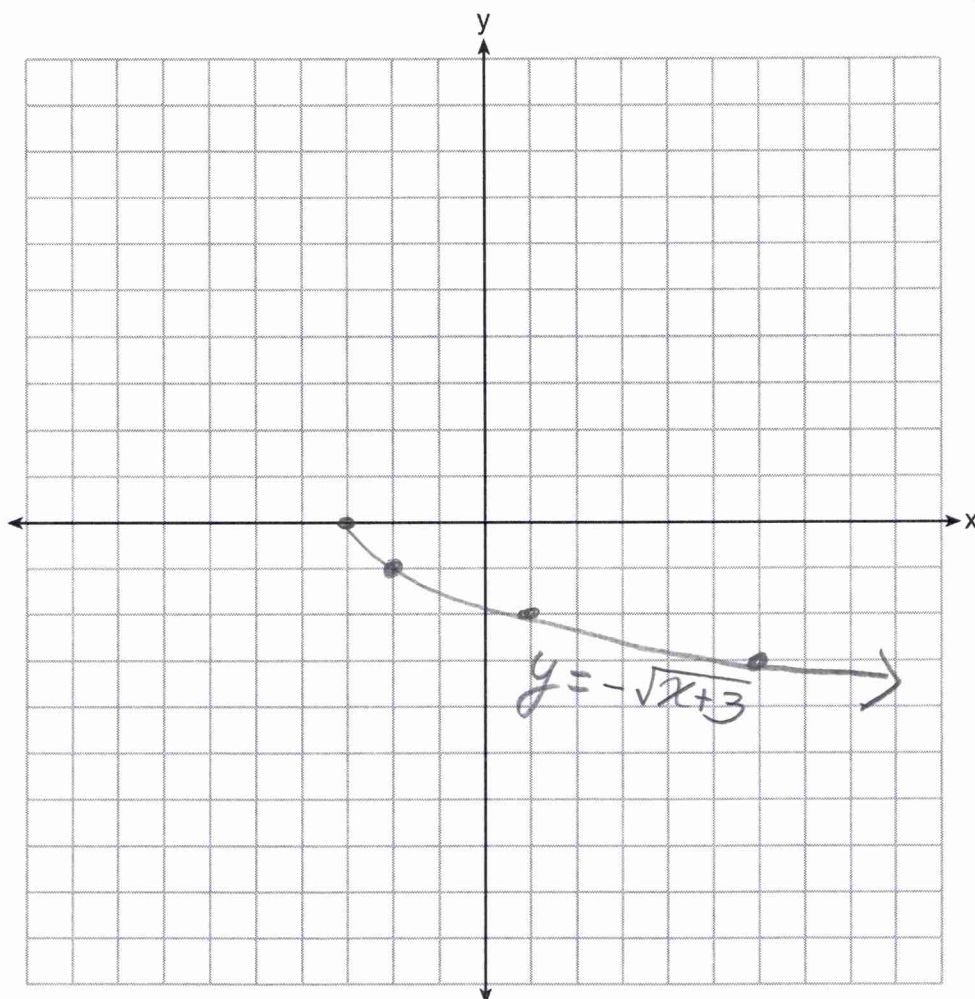
26 Richard is asked to transform the graph of $b(x)$ below.

The graph of $b(x)$ is transformed using the equation $h(x) = b(x - 2) - 3$. Describe how the graph of $b(x)$ changed to form the graph of $h(x)$.

Shift To The Right 2 Units

Shift Down 2 Units

27 Consider the pattern of squares shown below:

Which type of model, linear or exponential, should be used to determine how many squares are in the nth pattern? Explain your answer.

1st $= 2$

2nd $= 4 = 2 \cdot 2$

3rd $= 8 = 2 \cdot 2 \cdot 2$

4th will be $16 = 2 \cdot 2 \cdot 2 \cdot 2$

Pattern is Times 2

Exponential Model

1, 2

2, 4

3, 8

4, 16

5, 32

$n, 2^n$

2^n

28 When multiplying polynomials for a math assignment, Pat found the product to be $-4x + 8x^2 - 2x^3 + 5$. He then had to state the leading coefficient of this polynomial. Pat wrote down -4. Do you agree with Pat's answer? Explain your reasoning.

No I don't agree.

The polynomial is not in standard form.

The leading coefficient is the coefficient on the term with the largest exponent.

$-2x^3 + 8x^2 - 4x + 5$

-2 is the leading coefficient

29 Is the sum of $3\sqrt{2}$ and $4\sqrt{2}$ rational or irrational? Explain your answer.

Input in calc

$3\sqrt{2} + 4\sqrt{2} = 9.899494937$

Irrational

Also (we didn't discuss this method but...) just like an x can be combined only with another x, a $\sqrt{}$ can only be combined with a like $\sqrt{}$. So $3\sqrt{2} + 4\sqrt{2} = 7\sqrt{2} = 9.899494937$

30 The graph below shows two functions, $f(x)$ and $g(x)$. State all the values of x for which $f(x) = g(x)$.
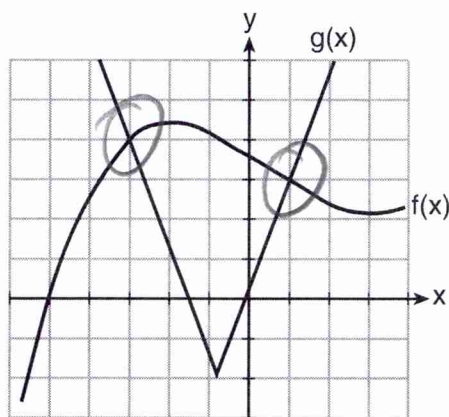
$-3 + 1$

31 Find the zeros of $f(x) = (x - 3)^2 - 49$, algebraically.

$$(x-3)^2 - 49 = 0$$
$$ +49 \quad +49$$
$$(x-3)^2 = 49$$
$$\sqrt{(x-3)^2} = \sqrt{49}$$
$$x - 3 = \pm 7$$
$$ +3 \quad +3$$
$$x = 3 \pm 7$$

$$x = 3 + 7 \qquad x = 3 - 7$$
$$x = 10 \qquad x = -4$$

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32 Solve the equation below for x in terms of a.

$$4(ax + 3) - 3ax = 25 + 3a$$

$$4ax + 12 - 3ax = 25 + 3a$$
$$ax + 12 = 25 + 3a$$
$$ -12 \qquad -12$$
$$\frac{ax}{a} = \frac{3a + 13}{a}$$
$$\boxed{x = \frac{3a + 13}{a}} \quad or \quad \boxed{x = 3 + \frac{13}{a}}$$

*This Question (#33) is from CW 90. It's OK that you are totally confused right now. ☺

Part III

Answer all 4 questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [16]

33 The data table below shows the median diameter of grains of sand and the slope of the beach for 9 naturally occurring ocean beaches.

Median Diameter of Grains of Sand, in Millimeters (x)	0.17	0.19	0.22	0.235	0.235	0.3	0.35	0.42	0.85
Slope of Beach, in Degrees (y)	0.63	0.7	0.82	0.88	1.15	1.5	4.4	7.3	11.3

Write the linear regression equation for this set of data, rounding all values to the *nearest thousandth*.
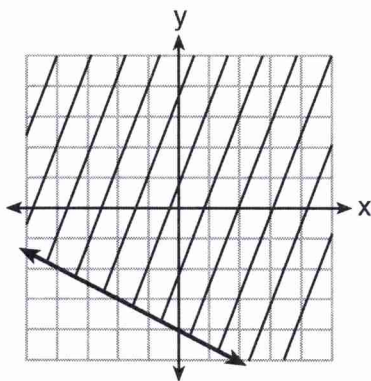
$a = 17.159$
$b = -2.476$

$y = 17.159x - 2.476$

Using this equation, predict the slope of a beach, to the *nearest tenth of a degree*, on a beach with grains of sand having a median diameter of 0.65 mm.

$y = 17.159(.65) - 2.476$

Algebra I (Common Core) – Aug. '16   [14]

34 Shawn incorrectly graphed the inequality $-x - 2y \geq 8$ as shown below.
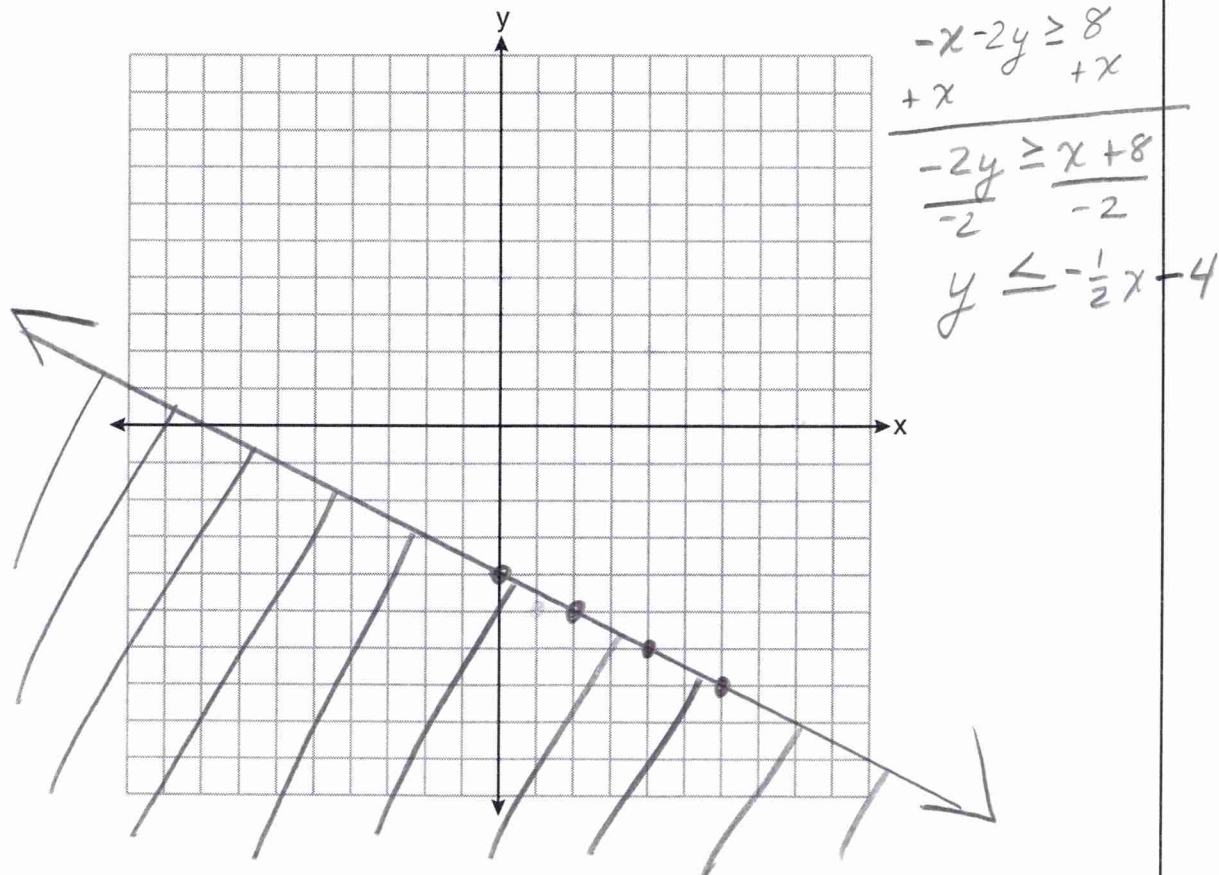
I did this second.

Explain Shawn's mistake.

Shawn shaded the wrong side.
It is possible he forgot to flip the $>$ when dividing by -4

Graph the inequality correctly on the set of axes below. *I did this first.*

$-x - 2y \geq 8$
$+x \qquad +x$

$\dfrac{-2y}{-2} \geq \dfrac{x+8}{-2}$

$y \leq -\dfrac{1}{2}x - 4$

35 A drama club is selling tickets to the spring musical. The auditorium holds 200 people. Tickets cost $12 at the door and $8.50 if purchased in advance. The drama club has a goal of selling at least $1000 worth of tickets to Saturday's show.

Write a system of inequalities that can be used to model this scenario.

Let x = Advanced Tickets

Let y = Tickets at Door

$x + y \leq 200$

$8.5x + 12y \geq 1000$

If 50 tickets are sold in advance, what is the minimum number of tickets that must be sold at the door so that the club meets its goal? Justify your answer.

$8.5(50) + 12y \geq 1000$

$425 + 12y \geq 1000$
$-425 \qquad\qquad -425$

$\dfrac{12y}{12} \geq \dfrac{575}{12}$

$y \geq 47.91\overline{6}$

This is the justification

48 tickets

36 Janice is asked to solve $0 = 64x^2 + 16x - 3$. She begins the problem by writing the following steps:

$$\text{Line 1} \quad 0 = 64x^2 + 16x - 3$$
$$\text{Line 2} \quad 0 = B^2 + 2B - 3$$
$$\text{Line 3} \quad 0 = (B + 3)(B - 1)$$

Use Janice's procedure to solve the equation for x.

$64x^2 = B^2$ $\qquad$ $\dfrac{16x}{2} = \dfrac{2B}{2}$ $\qquad$ $(8x+3)(8x-1) = 0$

$\sqrt{64x^2} = \sqrt{B^2}$ $\qquad$ $8x = B$ $\qquad$ $8x+3 = 0$ $\qquad$ $8x-1 = 0$

$8x = B$ $\qquad\qquad\qquad\qquad\qquad\qquad$ $\dfrac{8x}{8} = \dfrac{-3}{8}$ $\qquad$ $\dfrac{8x}{8} = \dfrac{1}{8}$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ $x = -\dfrac{3}{8}$ $\qquad$ $x = \dfrac{1}{8}$

Explain the method Janice used to solve the quadratic equation.

This is answer →

Janice solved by factoring.

★ I'm not sure why she chose to change $8x$ to B. I would have gotten the same solutions using the sum + product of the original equation.

This is Ms. G's opinion.

$S = 16$ $\qquad$ $(64x-8)(64x+24) = 0$
$P = -192$ $\qquad$ $64x-8 = 0$ $\qquad$ $64x+24 = 0$

1	192
2	96
(-8	24)

$64x = 8$ $\qquad$ $64x = -24$
$x = \dfrac{1}{8}$ $\qquad$ $x = -\dfrac{3}{24}$

★ This is a Dumb question. One of those the state uses so you can't get a 100%. I'm sorry. ☹

Part IV

Answer the question in this part. A correct answer will receive 6 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided to determine your answer. Note that diagrams are not necessarily drawn to scale. A correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [6]

37 For a class picnic, two teachers went to the same store to purchase drinks. One teacher purchased 18 juice boxes and 32 bottles of water, and spent $19.92. The other teacher purchased 14 juice boxes and 26 bottles of water, and spent $15.76.

Write a system of equations to represent the costs of a juice box, j, and a bottle of water, w.

$$18j + 32w = 19.92$$
$$14j + 26w = 15.76$$

Kara said that the juice boxes might have cost 52 cents each and that the bottles of water might have cost 33 cents each. Use your system of equations to justify that Kara's prices are *not* possible.

$$18(.52) + 32(.33) = 19.92 \qquad OK$$
$$19.92 = 19.92$$

$$14(.52) + 26(.33) = 15.76 \qquad Not\ OK$$
$$15.86 \neq 15.76$$

Solve your system of equations to determine the actual cost, in dollars, of each juice box and each bottle of water.

$$-14 \left(18j + 32w = 19.92\right)$$
$$18 \left(14j + 26w = 15.76\right)$$

$$-252j - 448w = -278.88$$
$$252j + 468w = 283.68$$
_____
$$\frac{20w}{20} = \frac{4.8}{20}$$
$$w = .24$$

$$18j + 32(.24) = 19.92$$
$$18j + 7.68 = 19.92$$
$$\frac{18j}{18} = \frac{12.24}{18}$$
$$j = .68$$

Juice = 68¢
Water = 24¢