

Algebra Review:

QUIZ 1

Name: Key

Date: _____ Bell: _____

1. Which statement *cannot* be justified by one of the properties of real numbers?

A. $(a + b) + c = a + (b + c)$

B. $a - (b \div c) = (a - b) \div c$

C. $(ab)c = a(bc)$

D. $(a + b) + 0 = 0 + (a + b)$

2. The statement "If $\frac{1}{2}x = 5$, then $x = 10$ " is justified by the -

F. Associative property of multiplication

G. Commutative property of multiplication

H. Addition property of equality

J. Multiplication property of equality

3. Which property justifies rewriting

$$\begin{aligned} 2x - 7x \\ \text{as} \\ x(2 - 7) ? \end{aligned}$$

A. Associative property of multiplication

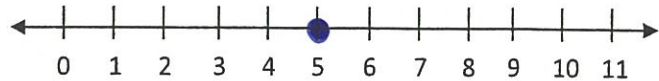
B. Distributive property

C. Commutative property of multiplication

D. Associative property of addition

4. Plot the point on the number line that corresponds to the value of the expression below.

$$\sqrt[3]{125}$$



5. Jon, who is the youngest member of the wrestling team at Northmont High School, is 3 years less than one-half the age of the coach. If the coach is n years old, which expression describes Jon's age? $\frac{1}{2}n - 3$

F. $\frac{1}{2}n - 3$

H. $2n + 3$

G. $3 - \frac{1}{2}n$

J. $2n - 3$

6. Simplify the numerical expression below.

$$\begin{aligned} & \frac{72 \div (\sqrt{100} - 4^2)}{\sqrt[3]{27}} \\ & \frac{72 \div (10 - 16)}{3} \\ & \frac{72 \div (-6)}{3} = -\frac{12}{3} \end{aligned}$$

ANSWER:

-4

7. Find the value of the expression below when $x = -4$ and $y = 2$

$$\begin{aligned} & -3x^2y + 4x \\ & -3(-4)^2(2) + 4(-4) \\ & -3(16)(2) + (-16) \\ & -96 + (-16) \end{aligned}$$

ANSWER:

-112

8. The formula for the surface area of a cylinder is $SA = 2\pi r(h + r)$. What is the value of SA when $r = 3$ centimeters and $h = 4$ centimeters?

$$2\pi(3)(4+3) = 42\pi$$

$$2\pi(3)(7)$$

- A. $28\pi \text{ cm}^2$ C. $36\pi \text{ cm}^2$
 B. $32\pi \text{ cm}^2$ D. $42\pi \text{ cm}^2$

9. What is the solution to $5 - \frac{n}{2} = 12$?

$$5 - \frac{n}{2} = 12$$

$$\frac{-5}{-5} \quad \frac{-5}{-5}$$

$$-2 - \frac{n}{2} = 7 - 2$$

$$n = -14$$

ANSWER: $n = -14$

10. What is the solution to the equation?

$$5(x + 2) = 7(4 - x)$$

$$5x + 10 = 28 - 7x$$

$$\frac{+7x}{+7x} \quad \frac{-7x}{-7x}$$

$$12x + 10 = 28$$

$$\frac{-10}{-10} \quad \frac{-10}{-10}$$

$$12x = 18$$

$$\frac{12x}{12} = \frac{18}{12}$$

$$x = 1.5$$

- A. -9 C. 3.2
 B. 1.5 D. 9

11. If $\frac{1}{3}t - 6 = 15$, what is the value of t?

$$\frac{1}{3}t - 6 = 15$$

$$\frac{+6}{+6} \quad \frac{+6}{+6}$$

$$3 \cdot \frac{1}{3}t = 21 \cdot 3$$

$$t = 63$$

- F. 21 H. 53
 G. 27 J. 63

12. Select the values of x that will make the following inequality true.

$$-3(x + 1) > 15$$

$$\frac{-3x - 3 > 15}{+3 \quad +3}$$

$$\frac{-3x > 18}{-3 \quad -3}$$

$$x < -6$$

-9 -6
 -8 -5
 -7 -4

13. What is the solution to the inequality below?

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

$$\frac{-3x}{-3x} \quad \frac{-3x}{-3x}$$

$$\frac{-5x + 6 > -4}{-6 \quad -6}$$

$$\frac{-5x > -10}{-5 \quad -5}$$

ANSWER: $x < 2$

14. The formula for the volume of a pyramid is

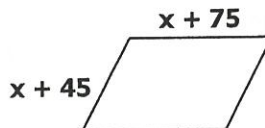
$$V = \frac{1}{3}bh$$

$$3 \cdot V = \frac{3V}{b} = bh$$

Which equation solves the formula for h?

- F. $h = 3Vb$ H. $h = \frac{3V}{b}$
 G. $h = \frac{3b}{V}$ J. $h = \frac{V}{3b}$

15. Tom's property has a shape of a parallelogram with the dimensions shown. If the perimeter of the property is 300 feet, what is the value of x?



$$2x + 150 + 2x + 90 = 300$$

$$4x + 240 = 300$$

$$\frac{4x}{4} = \frac{60}{4}$$

$$x = 15$$

- A. 90 ft
 B. 60 ft
 C. 45 ft
 D. 15 ft

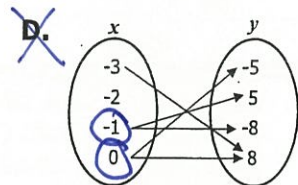
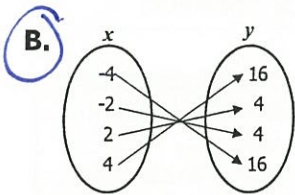
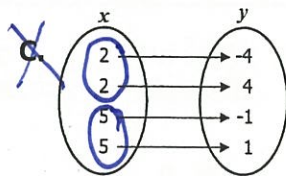
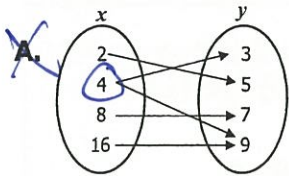
Algebra Review:

QUIZ 2

Name: Key

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1. Which of these data sets represents a function?



2. Which of the following does not represent a function of x ?

F.

x	1	1	1	1
y	1	2	3	4

H.

x	1	2	3	4
y	1	1	2	4

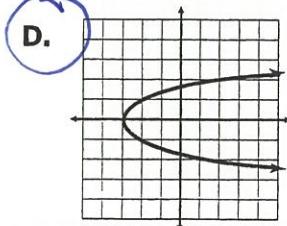
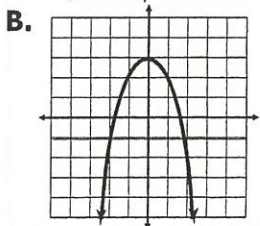
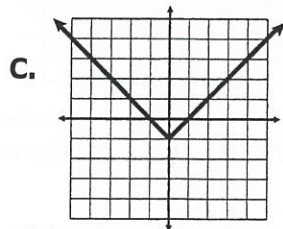
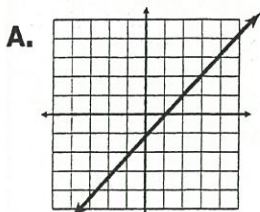
G.

x	1	2	3	4
y	2	2	2	2

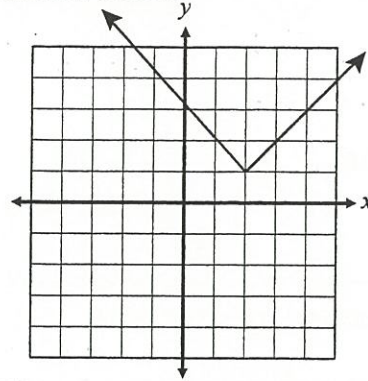
J.

x	0	2	4	6
y	0	1	3	5

3. Which of the following could not be the graph of a function of x ?



4. What is the apparent range of the function of x shown below?



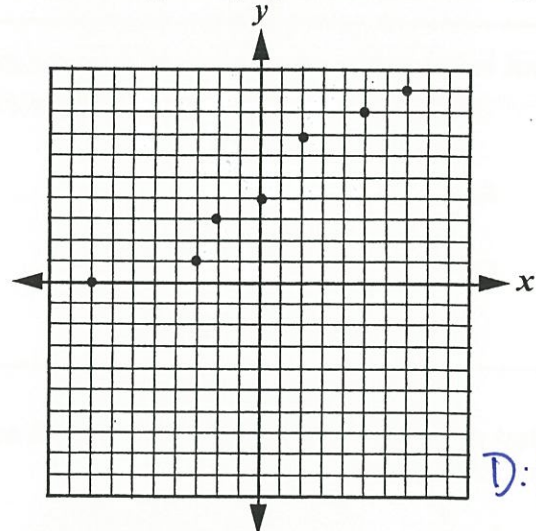
F. $x \geq 1$

H. $y \geq 2$

G. $y \geq 1$

J. all real numbers

5. The following is a graph of a function of x :



D: $\{-8, -3, -2, 0, 2, 5, 7\}$

Which best represents the domain of the function?

A. $\{-8, -3, -2, 0, 2, 5, 7\}$

B. $\{0, 1, 3, 4, 7, 8, 9\}$

C. $\{-8, -3, -2, 0, 2, 3, 4, 5, 7, 8, 9\}$

D. $\{0, 2, 5, 7\}$

6. If $f(x) = -2x^2 + x - 5$, what is $f(3)$?

$$\begin{aligned} f(3) &= -2(3)^2 + 3 - 5 \\ &= -2(9) + 3 - 5 \\ &= -18 + 3 - 5 \end{aligned}$$

ANSWER:

-20

7. What is the range of the function $f(x) = (x-1)^2$ when the domain is $\{-5, 0, 5\}$?

$(-5-1)^2 = 36$ $(5-1)^2 = 16$
 $(0-1)^2 = 1$

- A. $\{1, 16, 36\}$ C. $\{1, 26\}$
 B. $\{1, 24\}$ D. $\{-12, -2, 8\}$

8. Which is a zero of the function?

$f(x) = x^2 - x - 12$ $0 = x^2 - x - 12$
 $0 = (x-4)(x+3)$
 $x = 4, -3$

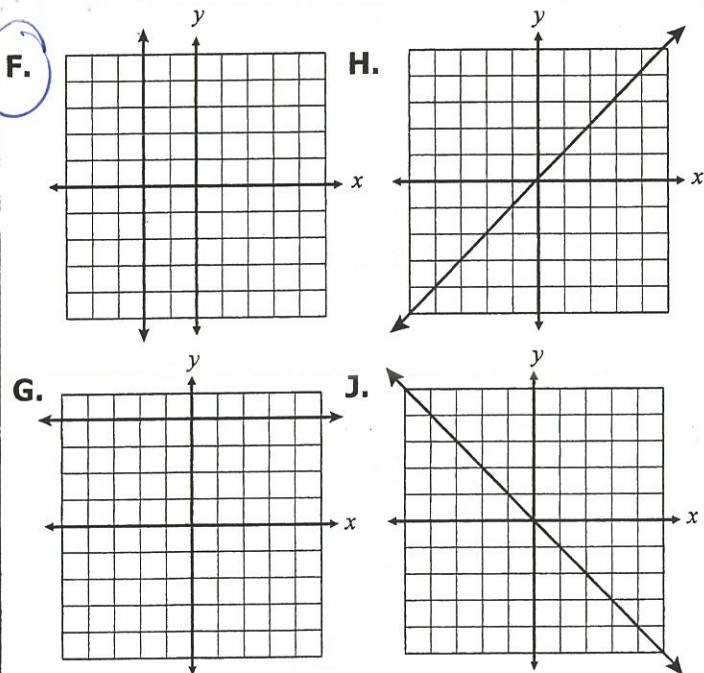
- F. 1 H. 3
 G. 2 J. 4

9. What is the slope of the line $4x + 8y = 12$?

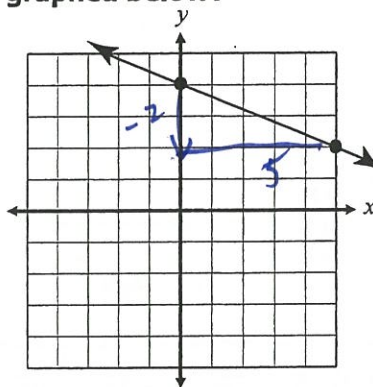
$8y = -4x + 12$
 $y = -\frac{1}{2}x + \frac{3}{2}$

- A. 4 C. -4
 B. $\frac{3}{2}$ D. $-\frac{1}{2}$

10. What graph best represents a line with an undefined slope?



11. What is the apparent slope of the line graphed below?



- A. $\frac{5}{2}$
 B. $\frac{2}{5}$
 C. $-\frac{5}{2}$
 D. $-\frac{2}{5}$

12. What is the slope of the line that passes through the points $(5, 0)$ and $(10, 0)$?

$\frac{0-0}{10-5} = \frac{0}{5}$
 F. 0 H. 5
 G. 1 J. undefined

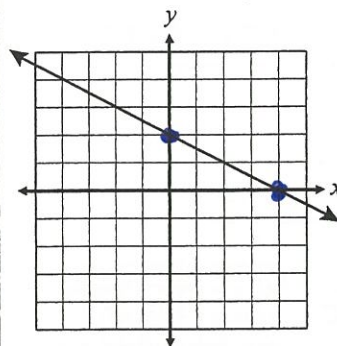
13. What is the slope of the line that passes through the points $(3, 2)$ and $(-1, -4)$? Give your answer as a fraction in simplest form.

$\frac{-4-2}{-1-3} = \frac{-6}{-4} = \frac{3}{2}$

ANSWER:

$\frac{3}{2}$

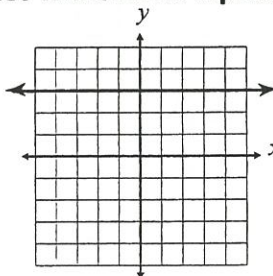
14. What is the equation of the graphed line?



- A. $x + 2y = 4$
 B. $x + 2y = -4$
 C. $2x + y = 2$
 D. $2x - y = 2$

$y = 2$
 $x = 4$ Intercepts

15. What is the equation of the graphed line?



- A. $y = x + 3$
 B. $y = 3x$
 C. $y = 3$
 D. $x = 3$

Algebra Review:

QUIZ 3

Name: _____

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1. Write the equation of the line passing through the point (2, -1) with a slope of -3.

$$y - y_1 = m(x - x_1)$$

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

$$y + 1 = -3x + 6$$

$$y = -3x + 5$$

ANSWER:

$$y = -3x + 5$$

2. Which is an equation of the line with a slope of $\frac{2}{3}$ passing through the point (4, -1)?

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

$$y + 1 = \frac{2}{3}x - \frac{8}{3}$$

$$y = \frac{2}{3}x - \frac{11}{3}$$

A. $y = -\frac{1}{4}x + \frac{2}{3}$

C. $y = \frac{2}{3}x - \frac{5}{3}$

B. $y = -4x + \frac{2}{3}$

D. $y = \frac{2}{3}x - \frac{11}{3}$

3. Write the equation of the line passing through the points (-4, -7) and (8, -13)

$$\frac{-13 - (-7)}{8 - (-4)} = \frac{-6}{12} = -\frac{1}{2}$$

$$-\frac{20}{3} - \frac{21}{3}$$

$$y + 7 = -\frac{5}{3}(x + 4)$$

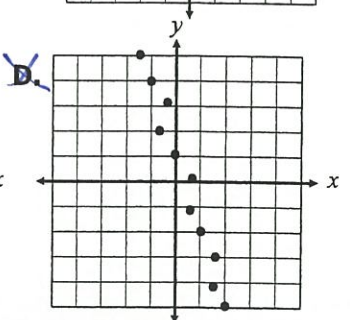
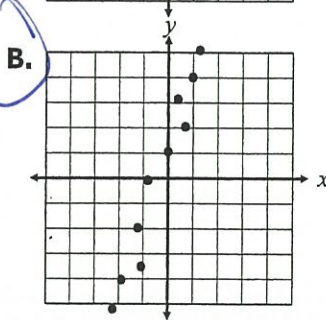
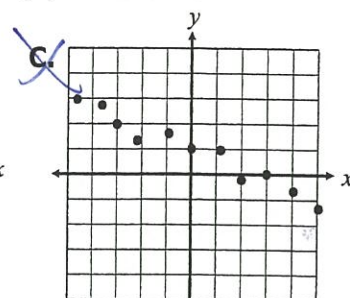
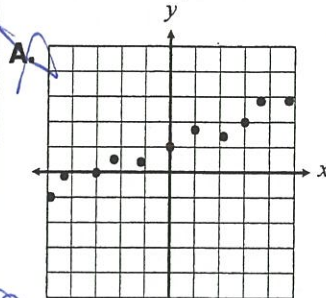
$$y + 7 = -\frac{5}{3}x - \frac{20}{3}$$

$$y = -\frac{5}{3}x - \frac{41}{3}$$

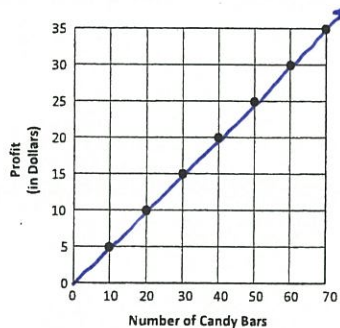
ANSWER:

$$y = -\frac{5}{3}x - \frac{41}{3}$$

4. Which scatterplot most likely has a line of best fit represented by $y = 3x + 1$?



5. The graph represents the relationship between the number of candy bars sold and the amount of profit made during the softball team's candy bar sale.



$$y = \frac{1}{2}x$$

- Which is closest to the minimum number of candy bars that must be sold to make a \$400 profit?

A. 650

C. 750

B. 700

D. 800

6. Which table does not show a direct variation?

F.

x	-2	-1	0	1
y	-8	-4	0	4

 $4 \quad 4 \quad 0 \quad 4$

H.

x	0	3	6	9
y	0	1	2	3

 $0 \quad \frac{1}{3} \quad \frac{1}{3} \quad \frac{1}{3}$

G.

x	1	2	3	4
y	5	10	15	20

 $5 \quad 5 \quad 5 \quad 5$

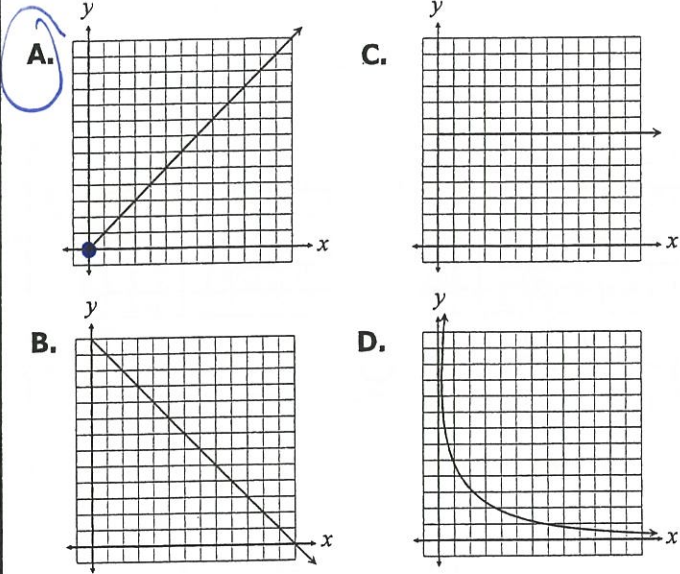
**J.

x	1	2	3	4
y	1	4	9	16

 $1 \quad 2 \quad 3 \quad 4$

← goes through origin

7. Which graph shows that y varies directly as x ?



8. Which set of ordered pairs satisfies an inverse variation?

$y = \frac{k}{x}$ $k = yx$

- F. (6, 3) and (8, 4)
- G. (2, -3) and (4, 5)
- H. (4, -2) and (-5, 10)
- J. (2, 6) and (-3, -4)

9. In the table below, y varies inversely as x . What is the missing value?

x	y
3	4
6	2
24	?

$= 12$
 $= 12$

- A. 1
- B. 3
- C. 0.5
- D. 0.25

10. If the point (2, -10) lies on the graph of a direct variation, which represents the direct variation equation?

$y = kx$ $k = -5$
 $-10 = k \cdot 2$

- F. $y = -20x$
- H. $y = -5x$
- G. $y = \frac{-20}{x}$
- J. $y = \frac{-5}{x}$

11. For a group of objects made of the same material, the weight of an object varies directly with its volume. If an object that has a volume of 30 cubic inches weighs 24 ounces, what is the constant of variation?

$24 = k \frac{30}{30}$
 $\frac{24}{30} = \frac{k}{30}$
 $\frac{4}{5}$

- F. $\frac{4}{5}$
- G. 720
- H. $\frac{5}{4}$
- J. 6

12. The time required to complete a job varies inversely as the number of people working. It takes 4 hours for 7 electricians to wire a building. How long would it take 3 electricians to do the job?

$4 \cdot 7 = 28$
 $28 = 9.3 \cdot 3$
 $3 \overline{) 28.0}$
 $\underline{27} $
 10

- A. 1 hr 43 min
- B. 5 hr 15 min
- C. 7 hr 30 min
- D. 9 hr 20 min

13. Sarah burned 280 calories running 20 minutes. The next day, Sarah burned 490 calories running for 35 minutes.

- Let c represent the number of calories.
- Let t represent time, in minutes, spent running.

Which equation represents this relationship?

$\frac{280}{20} = \frac{490}{35}$
 $14 = k$

- A. $c = 5600t$
- B. $ct = 5600$
- C. $c = 14t$
- D. $t = 14c$

Algebra Review:

QUIZ 4

Name: _____

Date: _____ Bell: _____

1. What is the solution to the system below?

$$\begin{cases} x + y = 5 \\ x - y = 3 \end{cases}$$

$$\begin{array}{r} 2x = 8 \\ \frac{2}{2} \quad \frac{2}{2} \\ x = 4 \end{array}$$

$$\begin{array}{r} 4 + y = 5 \\ -4 \quad -4 \\ \hline y = 1 \end{array}$$

- A. (8, -3) C. (5, 2)
B. (6, -1) **D. (4, 1)**

2. What is the solution to the system below?

$$\begin{cases} x + 3y = 0 \\ 2x - y = -7 \end{cases}$$

$$\begin{array}{r} -2x - 6y = 0 \\ \hline -7y = -7 \\ \frac{-7}{-7} \quad \frac{-7}{-7} \\ y = 1 \end{array}$$

$$\begin{array}{r} x + 3(1) = 0 \\ x + 3 = 0 \\ \quad -3 \quad -3 \\ \hline x = -3 \end{array}$$

- A. $(10\frac{1}{2}, -3\frac{1}{2})$ C. $(-3, \frac{1}{3})$
B. (-3, 1) D. (3, 1)

3. What is the solution to the system below?

$$\begin{cases} -4x + 5y = 27 \\ (x - 6y = -2) \cdot 4 \end{cases}$$

$$\begin{array}{r} 4x - 24y = -8 \\ \hline -19y = 19 \\ \frac{-19}{-19} \quad \frac{19}{-19} \\ y = -1 \end{array}$$

$$\begin{array}{r} x - 6(-1) = -2 \\ x + 6 = -2 \\ \quad -6 \quad -6 \\ \hline x = -8 \end{array}$$

ANSWER:

(-8, -1)

4. What is the solution to the system below?

$$\begin{cases} y = 5x - 9 \\ y = x + 3 \end{cases}$$

$$\begin{array}{r} -y = -5x + 9 \\ \hline 0 = -4x + 12 \\ \frac{-12}{-4} \quad \frac{12}{-4} \\ -12 = -4x \\ \frac{-12}{-4} \quad \frac{-4x}{-4} \\ x = 3 \end{array}$$

x = 3

$$\begin{array}{l} y = 3 + 3 \\ y = 6 \end{array}$$

ANSWER:

(3, 6)

5. What is the solution to the system below?

$$\begin{cases} 3x + y = 11 \\ y = x + 3 \end{cases}$$

$$\begin{array}{r} y = 2 + 3 \\ y = 5 \end{array}$$

$$\begin{array}{r} 3x + x + 3 = 11 \\ 4x + 3 = 11 \\ \quad -3 \quad -3 \\ \hline 4x = 8 \\ \frac{4x}{4} \quad \frac{8}{4} \\ x = 2 \end{array}$$

- A. (4, 7) C. (2, 17) x = 2
B. $(\frac{1}{2}, 3\frac{1}{2})$ **D. (2, 5)**

6. What is the solution to the system below?

$$\begin{cases} y = -3x - 2 \\ 6x + 2y = -4 \end{cases}$$

$$\begin{array}{r} 6x + 2(-3x - 2) = -4 \\ 6x + (-6x) - 4 = -4 \\ -4 = -4 \end{array}$$

- A. (6, 2) C. (-1, -5)
B. no solution **D. infinitely many solutions**

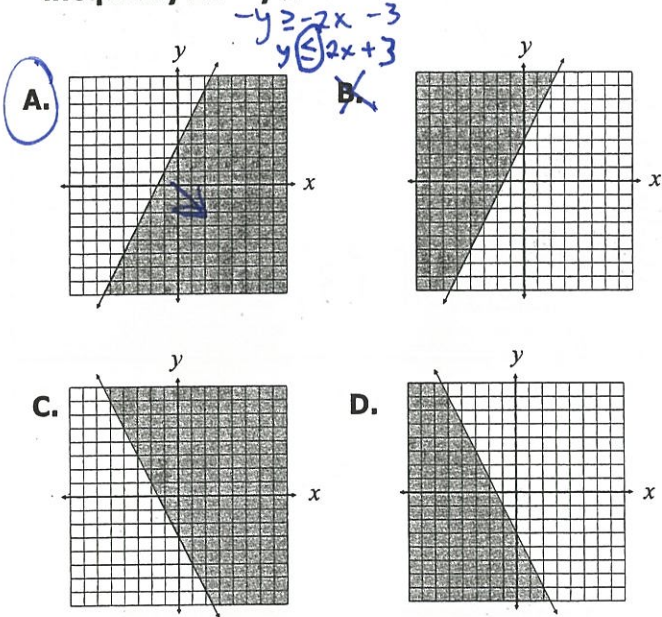
7. Rob has a collection of nickels and dimes worth \$1.65. If there are 25 coins total, how many dimes does he have?

$$\begin{array}{r} (N + D = 25) \cdot 0.05 \\ 0.05N + 0.10D = 1.65 \\ -0.05N - 0.05D = -1.25 \\ \hline 0.05D = 0.40 \\ \frac{0.05D}{0.05} = \frac{0.40}{0.05} \\ D = 800 \end{array}$$

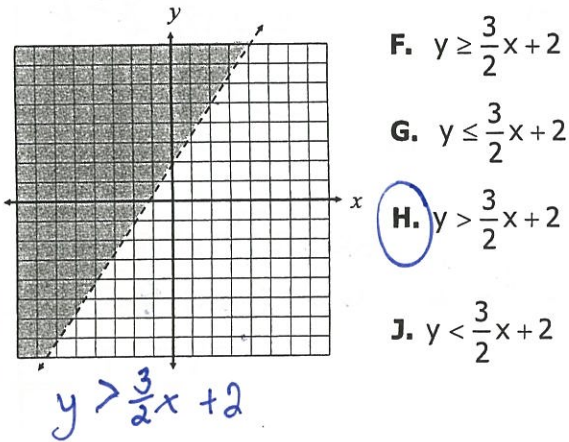
ANSWER:

800 Dimes

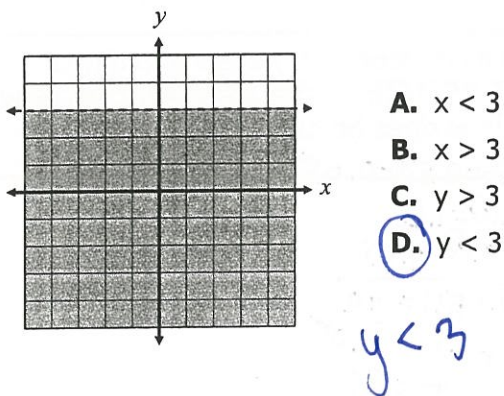
8. Which graph represents the solution to the inequality $2x - y \geq -3$?



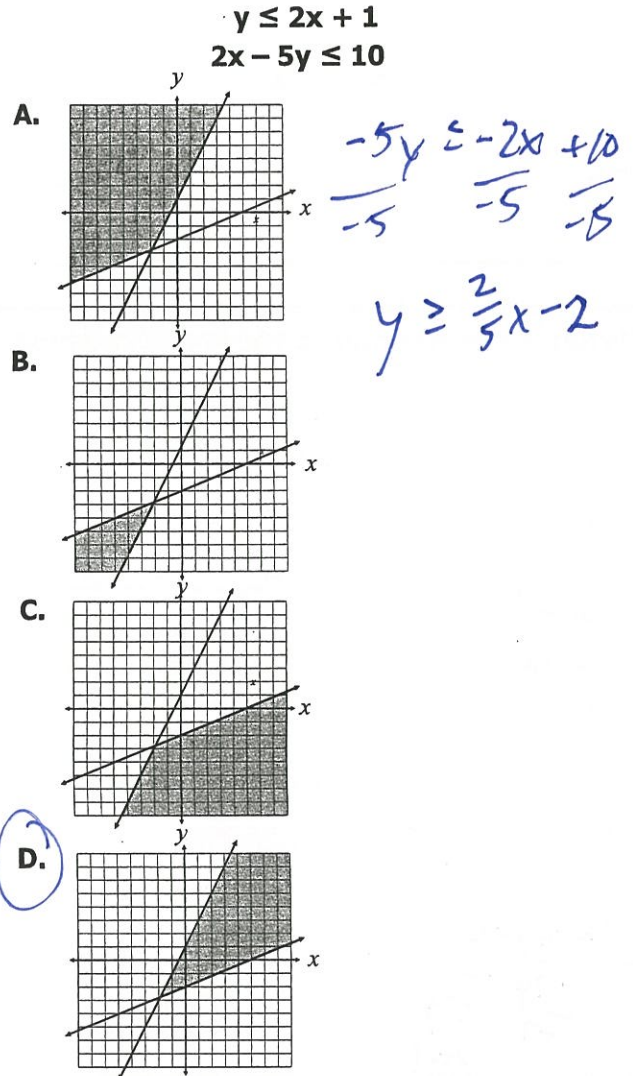
9. Which inequality is shown in the graph?



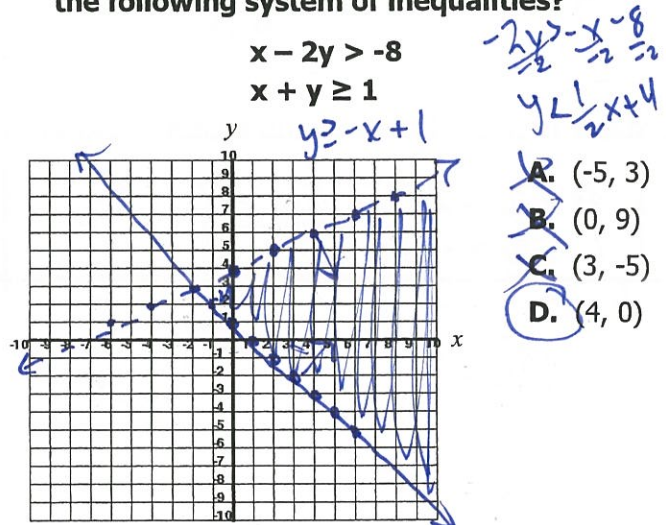
10. Which inequality is shown in the graph?



11. Graph the following system of inequalities.



12. Which ordered pair is in the solution set of the following system of inequalities?



Algebra Review:

QUIZ 5

Name: _____

Date: _____ Bell: _____

1. Which is equivalent to the expression below?

$$(3x^2 - 2x + 5) - (2x^2 + 5x + 1)$$

$$x^2 + 3x + 4$$

- A. $x^2 + 3x + 4$
- B. $x^2 - 7x + 6$
- C. $x^2 - 3x - 6$
- D. $x^2 - 7x + 4$

2. Which is equivalent to $(-2ab^3)(-3a^2b^5)$?

$$6a^3b^8$$

- F. $-5ab$
- G. $6a^2b^{15}$
- H. $6a^3b^2$
- J. $6a^3b^8$

3. Which is a simplified form of the following expression?

$$(xy^3)(xy)^4$$

- A. x^2y^7
- B. x^4y^{12}
- C. x^5y^7
- D. x^5y^{12}

$$xy^3 \cdot x^4y^4$$

$$x^5y^7$$

4. If $ab \neq 0$, which is equivalent to $\frac{-14a^3b^2}{7ab^2}$?

- F. $2a^2b$
- G. $-2a^2$
- H. $-7a^2b$
- J. $7a^4b^4$

$$-2a^2$$

5. Which is equivalent to $(3x^2y) \cdot (8xy^3)$?

A. $\frac{24}{xy^2}$

$$24x^{-1}y^{-2}$$

- B. $\frac{24x}{y^2}$
- C. $\frac{11}{xy^2}$
- D. $11xy^2$

$$\frac{24}{xy^2}$$

6. Which is equivalent to $\left(\frac{-2m^2n^3}{m^2n^4}\right)^2$?

F. $\frac{-4m}{n^2}$

$$\frac{(-2)^2 m^4 n^6}{m^4 n^8}$$

G. $\frac{-4}{n^2}$

H. $\frac{4m}{n^2}$

J. $\frac{4}{n^2}$

$$\frac{4}{n^2}$$

7. If $x \neq 0$, which expression is equivalent to

$$\frac{10x^7 - 2x^3 + 2x}{2x}$$

$$5x^6 - x^2 + 1$$

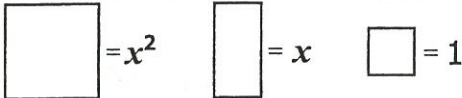
- A. $8x^6 - x^2$
- B. $5x^6 - x^2$
- C. $8x^7 - x^3 + x$
- D. $5x^6 - x^2 + 1$

8. Which expression is equivalent to

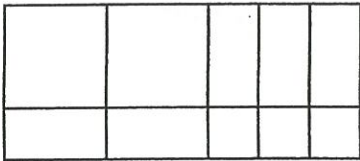
$$2x^3y(x^2y - 4xy^2)?$$

- F. $2x^5y^2 - 8x^4y^3$ H. $2x^6y^2 - 8x^3y^2$
 G. $3x^5y^2 - 6x^4y^3$ J. $2x^6y - 8x^3y^3$

9. Consider the following models:

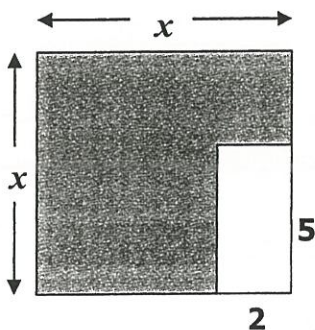


Which product is represented by the diagram below?



- A. $(x + 1)(x + 3)$ C. $(2x^2 + 3)(x + 1)$
 B. $(2x + 3)(x + 1)$ D. $(x^2 + x)(2x^2 + 3x)$

10. The figure below is composed of rectangles. Which expression represents the shaded area?



- A. $2x - 10$
 B. $x^2 - 10$
 C. $x^2 - 7x + 10$
 D. $x^2 + 7x - 10$

$$x^2 - 10$$

11. What is $\sqrt{192}$ expressed in simplest radical form?

$$\sqrt{64}\sqrt{3}$$

- F. $8\sqrt{3}$ H. $4\sqrt{12}$
 G. $6\sqrt{5}$ J. $2\sqrt{48}$

12. What is $\sqrt[3]{243}$ expressed in simplest radical form?

$$\sqrt[3]{27}\sqrt[3]{9}$$

- A. $6\sqrt[3]{2}$ C. $9\sqrt[3]{3}$
 B. $3\sqrt[3]{9}$ D. $9\sqrt[3]{2}$

13. What is $\sqrt{72n^3}$ expressed in simplest radical form?

$$\sqrt{36}\sqrt{2}\sqrt{n^2}\sqrt{n}$$

- F. $6n\sqrt{2n}$ H. $3n\sqrt{8n}$
 G. $6n^2\sqrt{2n}$ J. $3n^2\sqrt{8n}$

14. What is $\sqrt{180x^9y^{16}}$ in simplest form?

$$\sqrt{36}\sqrt{5}\sqrt{x^8}\sqrt{x}\sqrt{y^{16}}$$

- A. $3x^3y^4\sqrt{20}$ C. $6x^3y^4\sqrt{5}$
 B. $3x^4y^8\sqrt{20x}$ D. $6x^4y^8\sqrt{5x}$

15. Which of the following radical expressions simplifies to $2x^2y\sqrt{5x}$?

$$4x^4y^2 \cdot 5x$$

- F. $\sqrt{10x^3y}$ H. $\sqrt{20x^3y}$
 G. $\sqrt{10x^5y^2}$ J. $\sqrt{20x^5y^2}$

Name: _____

Factoring

GCF	DIFFERENCE OF SQUARES	BASIC TRINOMIAL	SLIP & SLIDE TRINOMIAL
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Polynomials that can't be factored at all are called _____!

1. $21c - 12$	2. $x^2y + 8x$	3. $75a^2b^3c - 30ab^2$
4. $4m^2 - 81n^2$	5. $12x^2 - 12$	6. $27b^3 - 75b^3$
7. $p^2 - 13p + 30$	8. $n^3 - 4n^2 - 60n$	9. $5w^2 - 15w - 20$
10. $3x^2 + 10x + 3$	11. $12c^2 + 5c - 2$	12. $2x^2 - 5x + 4$

Oh review examples page

Dividing Polynomials by a Binomial

1. $\frac{x^2 - 12x + 20}{x - 10}$	2. $\frac{y^2 - y - 56}{y + 7}$	3. $(x^2 - 1) \div (x + 1)$
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Graphing Quadratic Equations

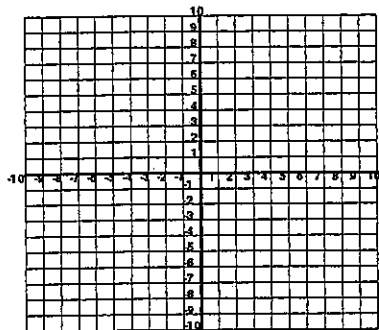
STANDARD FORM OF A QUADRATIC EQUATION:

FORMULA FOR THE AXIS OF SYMMETRY:

WHEN GRAPHED, A QUADRATIC EQUATION CREATES A _____.

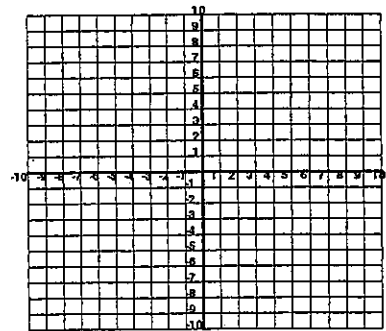
1. $y = -x^2 + 6x - 13$

x	y



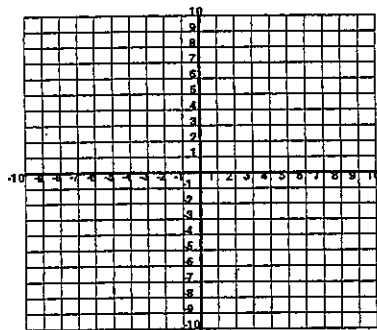
2. $y = x^2 - 9$

x	y



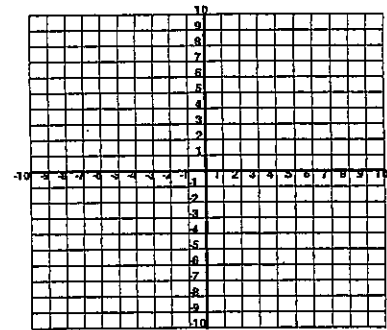
3. $y = (x - 5)(x + 1)$

x	y



4. $y = (x - 2)^2$

x	y



Solving Quadratic Equations

The solutions to a quadratic equation are the point(s) at which the parabola intersects the _____.

To solve a quadratic equation, use one of the following methods:

- Factoring
- Quadratic Formula

1. $x^2 + 8x = 0$

2. $4x^2 = 10x$

3. $x^2 + 5x = 6$	4. $x^2 = 18x - 81$
11. $2x^2 + 5 = 77$	6. $3x^2 + 9x - 30 = 0$
7. $6x^2 - x = 2$	8. $4x^2 + 1 = 50$
9. $(x + 1)(x - 4) = 6$	10. $\frac{2}{3}x^2 - 14 = 136$

Quadratic Equation Word Problems

1. The length of a rectangle is 4 inches less than twice its width. If the area of the rectangle is 70 square inches, what are its dimensions?

2. The stress distribution on a structure is given by $s = 2x^2 + 4x - 30$ where s is stress in pounds per square inch and x is the distance in feet from a reference point. At what distance is the stress equal to 0?

3. The number of seconds to complete a chemical reaction was determined to be given by the equation $s = 250 - 5t - t^2$, where s is the number of seconds and t is the temperature in degrees Celsius at which the reaction occurred. If a chemical reaction was complete in 200 seconds, what was the temperature at which the reaction occurred?

4. A toy rocket is launched from a platform that is 48 feet high. The rocket's height above the ground is modeled by the equation $h = -16t^2 + 32t + 48$.

a) What is the maximum height of the rocket?

b) What is the rocket's height at 2 seconds?

c) How long will it take the rocket to reach the ground?

Curve of Best Fit (Quadratic Regression)

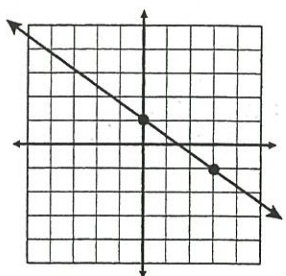
1. Given the data in the table below, find an equation to model the curve of best fit.

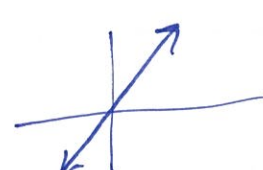
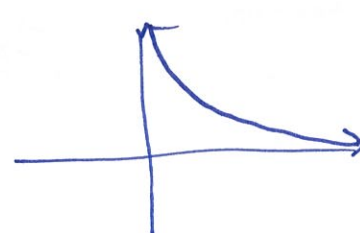
x	y
0	0
1	66
2	100
3	102
4	72

2. Given the data in the table below, find an equation to model the curve of best fit.

x	0	1	2	3	4
y	305	367	397	395	361

Formulas You "Gots to Know!"

Formula	Notes	Examples
<p>Slope-Intercept Form</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $y = mx + b$ </div>	<p>Used to identify the equation of a <u>line</u>.</p> <p>$m = \frac{\text{slope}}{\hspace{1cm}}$</p> <p>$b = \frac{\text{y-intercept}}{\hspace{1cm}}$</p>	<p>Identify the equation:</p>  <p>$b = 1$ $m = -\frac{2}{3}$ $y = -\frac{2}{3}x + 1$</p>
<p>Standard Form (of a Linear Equation)</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $Ax + By = C$ </div>	<p>Also used to identify the equation of a <u>line</u>.</p> <p>*Be able to convert to $y = mx + b$ in order to best match the equation to the graph.</p>	<p>Convert to slope-intercept:</p> <p>1) $x - y = 1$ $\frac{-x - y}{-x} = \frac{-x + 1}{-x}$ $y = x - 1$</p> <p>2) $x + 3y = 21$ $\frac{-x + 3y}{-x} = \frac{-x + 21}{-x}$ $y = -\frac{1}{3}x + 7$</p> <p>3) $2x - 5y = 20$ $\frac{-2x - 5y}{-5} = \frac{-2x + 20}{-5}$ $y = \frac{2}{5}x - 4$</p>
<p>Slope Formula</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $m = \frac{y_2 - y_1}{x_2 - x_1}$ </div>	<p>Used to find the slope between two ordered pairs: (x_1, y_1) and (x_2, y_2)</p> <p>*A zero "underneath" means <u>no slope</u>.</p> <p>*A zero in the top means <u>0</u>.</p>	<p>Find the slope between:</p> <p>1) $(-2, 5)$ and $(6, -1)$ $\frac{-1 - 5}{6 - (-2)} = \frac{-6}{8} = -\frac{3}{4}$</p> <p>2) $(9, -4)$ and $(9, 2)$ $\frac{2 - (-4)}{9 - 9} = \frac{6}{0}$ No Slope</p> <p>3) $(-7, -3)$ and $(0, -3)$ $\frac{-3 - (-3)}{0 - (-7)} = \frac{0}{7} = 0$</p>

<p>Point-slope Formula</p> $y - y_1 = m(x - x_1)$	<p>Used to find the equation of a line given the <u>slope</u> (m) and a <u>point</u> (x_1, y_1) on the line.</p> <p>*If Given Two Points</p> <p>Find the <i>slope</i>, then use the <i>point-slope formula</i> with either points to write the equation.</p>	<p>Write the linear equation given:</p> <p>1) $(-4, 7)$; slope = -1 $y - 7 = -1(x + 4)$ $y - 7 = -x - 4$ $\frac{y + 7}{+7} = \frac{-x - 4}{+7}$ $y = -x + 3$</p> <p>2) $(3, 8)$ and $(-9, 4)$ $\frac{4 - 8}{-9 - 3} = \frac{-4}{-12} = \frac{1}{3}$ $y - 8 = \frac{1}{3}(x - 3)$ $y - 8 = \frac{1}{3}x - 1$ $\frac{y + 8}{+8} = \frac{\frac{1}{3}x - 1}{+8}$ $y = \frac{1}{3}x + 7$</p>
<p>Direct Variation</p> $y = kx$	<p>$k = \frac{y}{x}$</p> <p>Check _____ for all ordered pairs.</p> <p>Direct Variation graph:</p> 	<p>Identify the constant and write the equation:</p> <p>1) $\{(-6, 3), (-4, 2), (-2, 1), (0, 0), (2, -1)\}$ $k = \frac{3}{-6} = -\frac{1}{2}$ $y = -\frac{1}{2}x$</p> <p>Find the missing value:</p> <p>2) $(5, 3), (20, y)$ $\frac{5}{3} = \frac{20}{y}$ $\frac{5y}{5} = \frac{60}{5}$ $y = 12$</p>
<p>Inverse Variation</p> $y = \frac{k}{x}$	<p>$k = yx$</p> <p>Check _____ for all ordered pairs.</p> <p>Inverse Variation graph:</p> 	<p>Identify the constant and write the equation:</p> <p>1) $\{(2, 24), (3, 16), (4, 12), (6, 8)\}$ $k = 2 \cdot 24 = 48$ $k = 48$ $y = \frac{48}{x}$</p> <p>Find the missing value:</p> <p>2) $(x, -10), (8, -5)$ $8 \cdot -5 = -40$ $x = 4$</p>
<p>Standard Form (of a Quadratic Equation)</p> $y = ax^2 + bx + c$	<p>Use $x = \frac{-b}{2a}$ to find the axis of symmetry and vertex.</p> <p>Set equation equal to <u>0</u> and use factoring or the quadratic formula to find roots!</p>	<p>Find the vertex and roots of the following:</p> <p>1) $y = (x - 4)^2 - 1$ $(x - 4)(x - 4)$ $y = x^2 - 8x + 16 - 1$ $x^2 - 4x - 4x + 16$ $y = x^2 - 8x + 15$ $x = \frac{8}{2(1)} = 4$ $y = 4^2 - 8(4) + 15$ $y = 16 - 32 + 15$ $V = (4, 1)$ $y = -1$</p>

Roots: $0 = x^2 - 8x + 15$
 $0 = (x - 3)(x - 5)$
 $x - 3 = 0$ $x - 5 = 0$ $x = \{3, 5\}$