

Prerequisite Skills for Algebra 2

- You should be able to do these problems without using a calculator.
- If you have questions, you can search the *italicized phrase(s)* in khanacademy.org.
- See Additional Problems on the following pages for more practice of each type.

<p>Solve for x. $3(x+1)-2=7$</p> <p>Keywords: <i>solving linear equations</i> Additional Problems</p>	<p>Solve the inequality and graph on a number line. $2x-5 < 1$</p> <p>Keywords: <i>solving and graphing linear inequalities</i> Additional Problems</p>	<p>Find the equation of the line going through the following points in point-slope form $(3, -2)$ and $(1, 5)$.</p> <p>Keywords: <i>point-slope form of a line</i> Additional Problems</p>
<p>Find the domain and range.</p> <p>Keywords: <i>domain and range</i> Additional Problems</p>	<p>Solve for $f(-2)$ and $f(a+h)$ for $f(x) = 4x - 3$.</p> <p>Keywords: <i>function notation</i> Additional Problems</p>	<p>Graph $3x + 2y = 12$ and find the x and y-intercepts.</p> <p>Keywords: <i>graphing lines</i> Additional Problems</p>
<p>Simplify. $(2x^3)^2(3x)$</p> <p>Keywords: <i>exponent rules</i> Additional Problems</p>	<p>If $f(x) = 6x^2 + 12x$ and $g(x) = 3x$, find and simplify...</p> <p>a.) $f(x) - g(x)$</p> <p>b.) $\frac{f(x)}{g(x)}$</p> <p>Keywords: <i>simplifying polynomials</i> Additional Problems</p>	<p>Solve for x and y. $2x + 3y = 20$ $-2x + y = 4$</p> <p>Keywords: <i>systems of equations</i> Additional Problems</p>
<p>If $h(x) = x^2 + 5x + 6$</p> <p>a.) find x when $h(x) = 0$.</p> <p>b.) graph $h(x)$.</p> <p>Keywords: <i>graphing and solving quadratics</i> Additional Problems</p>	<p>A video club costs \$25 to join. Each video rented costs \$3. Write a function that represents the total cost if v represents videos rented.</p> <p>Keywords: <i>writing linear equations</i> Additional Problems</p>	<p>Factor. $3x^2 - 13x + 12$</p> <p>Keywords: <i>factoring quadratic equations</i> Additional Problems</p>

Solving Linear Equations

Name _____

Solve each equation.

$$1) -4x - 12 = -2(7x + 6)$$

$$2) 2 + x = -1 + 4(3x - 2)$$

$$3) -38 - 3b = 4 - 8(5b - 4)$$

$$4) -2 - 5(6n - 6) = 2 - 4n$$

$$5) 29 + x = -7(x + 5)$$

$$6) 3 - 5x = 6(x - 5)$$

$$7) 8(a - 5) = -7a + 5$$

$$8) 5(-5k - 6) = -3 + 2k$$

Answers to

$$1) \{0\}$$

$$5) \{-8\}$$

$$2) \{1\}$$

$$6) \{3\}$$

$$3) \{2\}$$

$$7) \{3\}$$

$$4) \{1\}$$

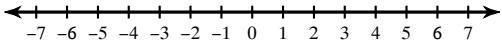
$$8) \{-1\}$$

Graphing Inequalities

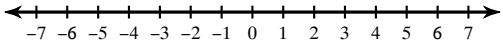
Name _____

Draw a graph for each inequality.

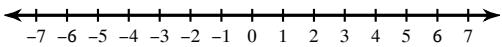
1) $m > -1$



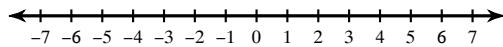
2) $n > 5$



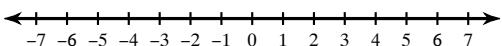
3) $k \geq -2$



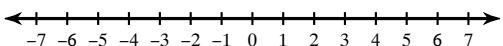
4) $r < -4$



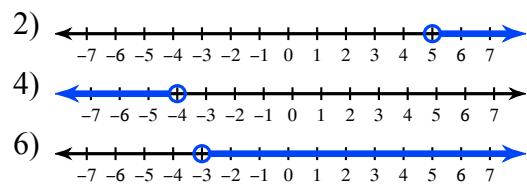
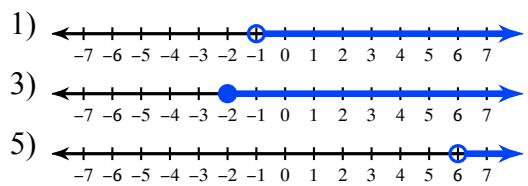
5) $n > 6$



6) $b > -3$



Answers to



Finding Lines

Name _____

Write the slope-intercept form of the equation of each line given the slope and y-intercept.

1) Slope = $\frac{1}{5}$, y-intercept = 4

2) Slope = $-\frac{3}{2}$, y-intercept = 1

3) Slope = -2, y-intercept = 3

4) Slope = $-\frac{1}{4}$, y-intercept = 3

Write the slope-intercept form of the equation of the line through the given points.

5) through: (0, -4) and (-1, 1)

6) through: (-3, -2) and (0, 2)

7) through: (-3, 4) and (-3, -4)

8) through: (-4, -2) and (0, 1)

Write the slope-intercept form of the equation of each line.

9) $y + 5 = -9(x - 1)$

10) $y - 5 = -5(x + 1)$

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

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

Write the slope-intercept form of the equation of the line described.

13) through: (4, 0), perp. to $y = -x - 2$

14) through: (5, 2), perp. to $y = -\frac{1}{7}x - 3$

15) through: (3, 5), perp. to $y = -\frac{2}{5}x + 3$

16) through: (-2, 5), perp. to $y = \frac{2}{3}x$

Answers to

1) $y = \frac{1}{5}x + 4$

5) $y = -5x - 4$

9) $y = -9x + 4$

13) $y = x - 4$

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

6) $y = \frac{4}{3}x + 2$

10) $y = -5x$

14) $y = 7x - 33$

3) $y = -2x + 3$

7) $x = -3$

11) $y = -\frac{4}{5}x$

15) $y = \frac{5}{2}x - \frac{5}{2}$

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

8) $y = \frac{3}{4}x + 1$

12) $y = \frac{1}{3}x - \frac{4}{3}$

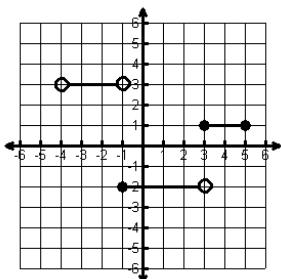
16) $y = -\frac{3}{2}x + 2$

Domain and Range

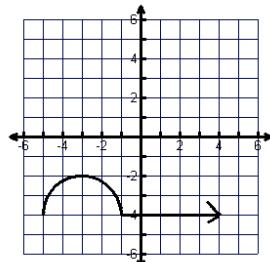
Name: _____

State the domain and range for each graph and then tell if the graph is a function (write yes or no). If the graph is a function, state whether it is discrete, continuous or neither.

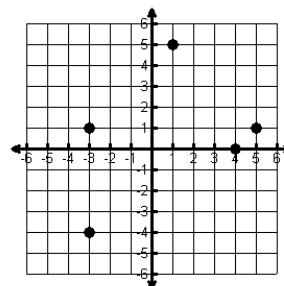
- 1) Domain _____
Range _____
Function? _____



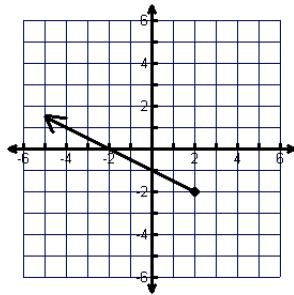
- 2) Domain _____
Range _____
Function? _____



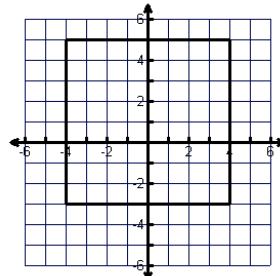
- 3) Domain _____
Range _____
Function? _____



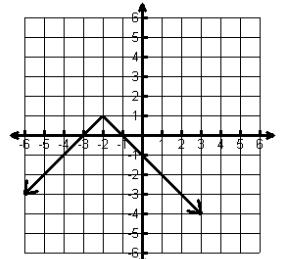
- 4) Domain _____
Range _____
Function? _____



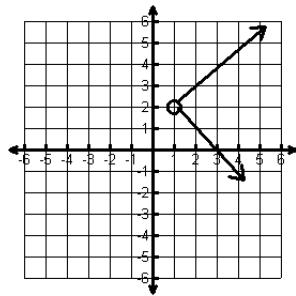
- 5) Domain _____
Range _____
Function? _____



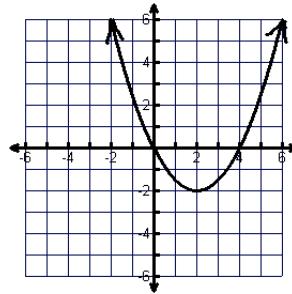
- 6) Domain _____
Range _____
Function? _____



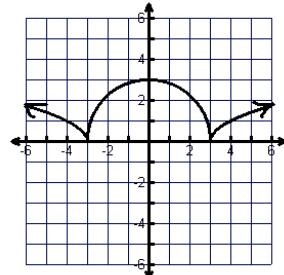
- 7) Domain _____
Range _____
Function? _____



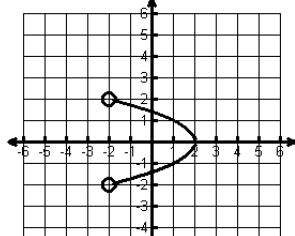
- 8) Domain _____
Range _____
Function? _____



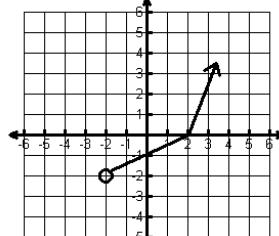
- 9) Domain _____
Range _____
Function? _____



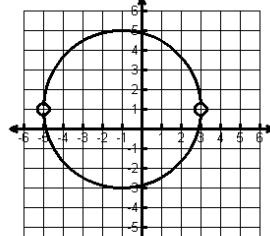
- 10) Domain _____
Range _____
Function? _____



- 11) Domain _____
Range _____
Function? _____



- 12) Domain _____
Range _____
Function? _____

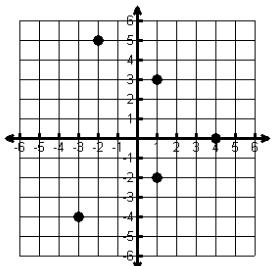


Domain and Range

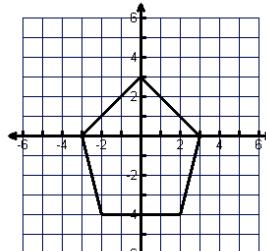
NAME: MR. Q

State the domain and range for each graph and then tell if the graph is a function (write yes or no).

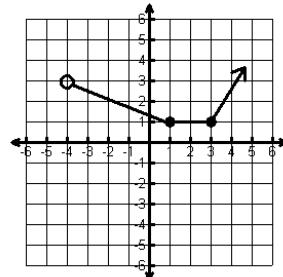
- 1) Domain $\{x=-3,5,-2,4\}$
 Range $\{-4,-2,0,3,5\}$
 Function? No



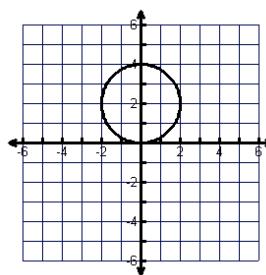
- 2) Domain $\{-3 \leq x \leq 3\}$
 Range $\{-4 \leq y \leq 3\}$
 Function? No



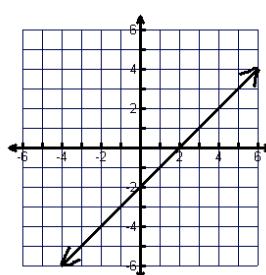
- 3) Domain $\{x > -4\}$
 Range $\{y \geq 1\}$
 Function? Yes



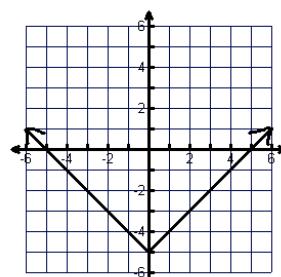
- 4) Domain $\{-2 \leq x \leq 2\}$
 Range $\{0 \leq y \leq 4\}$
 Function? Yes



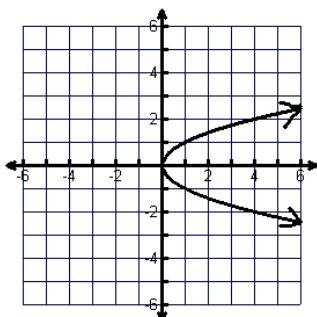
- 5) Domain R
 Range R
 Function? Yes



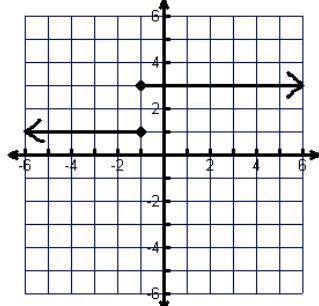
- 6) Domain R
 Range $\{y \geq -5\}$
 Function? Yes



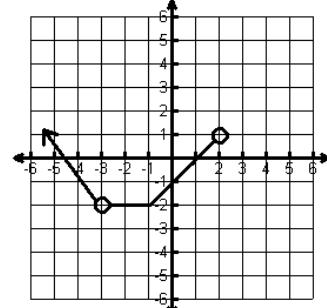
- 7) Domain $\{x \geq 0\}$
 Range R
 Function? No



- 8) Domain R
 Range $\{y = 1, 3\}$
 Function? _____ No



- 9) Domain $\{x < 2 \text{ & } x \neq -3\}$
 Range $\{y \geq -2\}$
 Function? Yes



Domain and Range

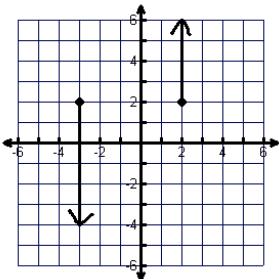
Name: _____

State the domain and range for each graph and then tell if the graph is a function (write yes or no).

- 1) Domain
- $\{x = -3, 2\}$

Range R

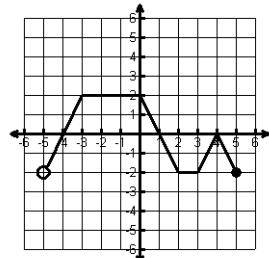
Function? No



- 2) Domain
- $\{-5 < x \leq 5\}$

Range $\{2 \leq y \leq 2\}$

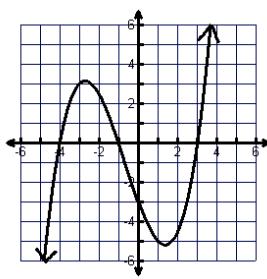
Function? No



- 3) Domain R

Range R

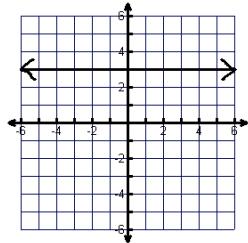
Function? Yes



- 4) Domain R

Range $\{y=3\}$

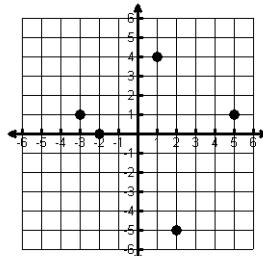
Function? No



- 5) Domain
- $\{x = -3, -2, 1, 2, 5\}$

Range $\{y = -5, 0, 1, 4\}$

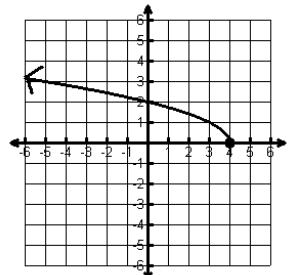
Function? Yes



- 6) Domain
- $\{x \leq 4\}$

Range $\{y \geq 0\}$

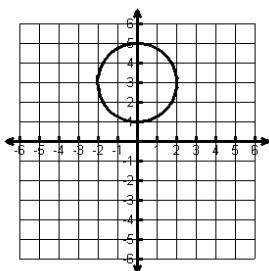
Function? Yes



- 7) Domain
- $\{-2 \leq x \leq 2\}$

Range $\{1 \leq y \leq 5\}$

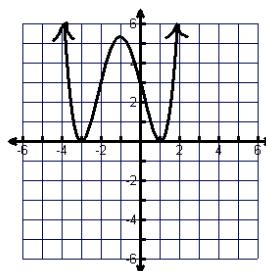
Function? No



- 8) Domain R

Range $\{y \geq 0\}$

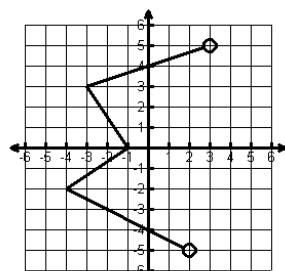
Function? Yes



- 9) Domain
- $\{-4 \leq x < 3\}$

Range $\{-5 < y < 5\}$

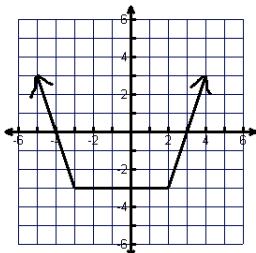
Function? No



- 10) Domain R

Range $\{y \geq -3\}$

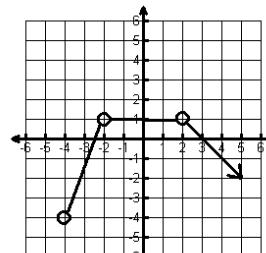
Function? Yes



- 11) Domain
- $\{x > -4 \text{ & } x \neq -2, 2\}$

Range $\{y \leq 1\}$

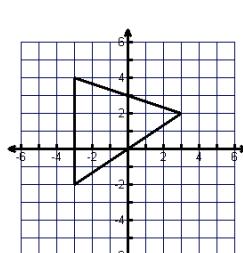
Function? Yes



- 12) Domain
- $\{-3 \leq x \leq 3\}$

Range $\{-2 \leq x \leq 4\}$

Function? No



Function Notation

Name _____

Evaluate each function.

1) $g(n) = 4n - 5$; Find $g(-7)$

2) $k(x) = -3|x + 2|$; Find $k(10)$

3) $h(x) = 2x - 1$; Find $h(8)$

4) $h(x) = 2x$; Find $h(-8)$

5) $p(n) = n^3 - 5n$; Find $p(2)$

6) $h(n) = n^3 - 4$; Find $h(5)$

7) $h(n) = |-n|$; Find $h(-5)$

8) $g(x) = 2x + 3$; Find $g(10)$

9) $w(x) = x^2 - 4x$; Find $w(4x)$

10) $p(n) = -4n - 1$; Find $p(n - 4)$

11) $w(n) = 3n^3 + n$; Find $w(-2n)$

12) $w(n) = -3n + 4$; Find $w(3n)$

Answers to

1) -33

5) -2

9) $16x^2 - 16x$

2) -36

6) 121

10) $-4n + 15$

3) 15

7) 5

11) $-24n^3 - 2n$

4) -16

8) 23

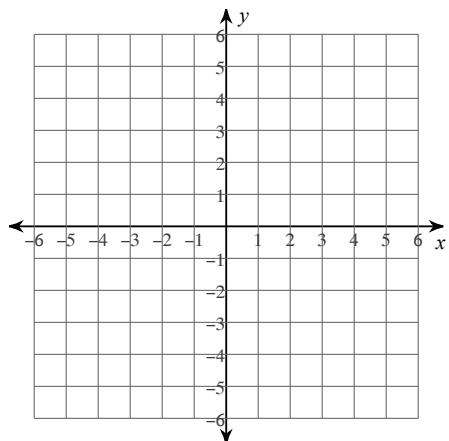
12) $-9n + 4$

Graphing Lines

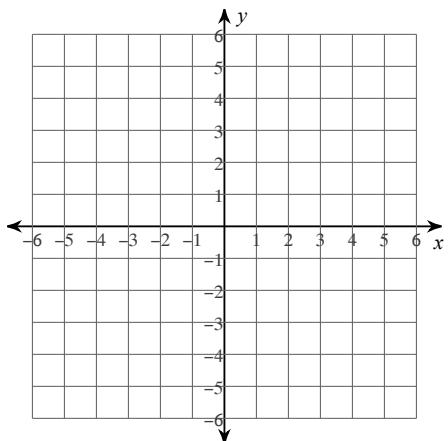
Name _____

Sketch the graph of each line.

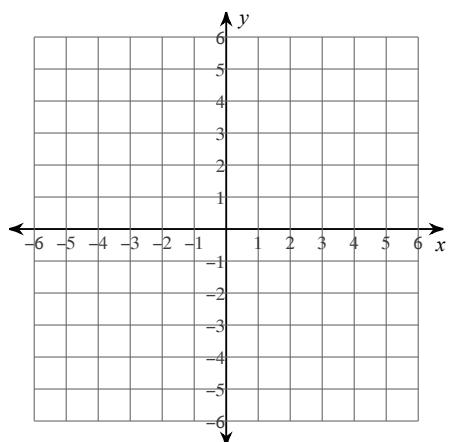
1) $6x + y = 3$



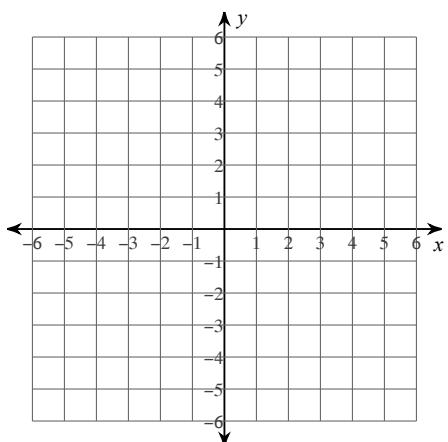
2) $y = -4$



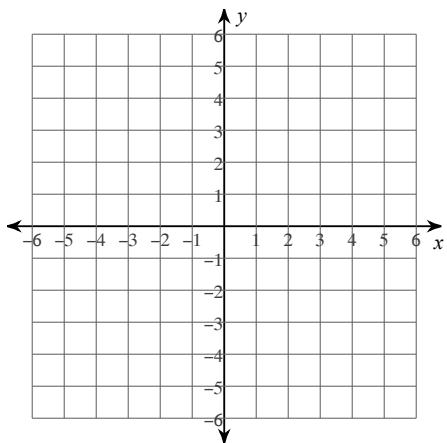
3) $4x + y = 4$



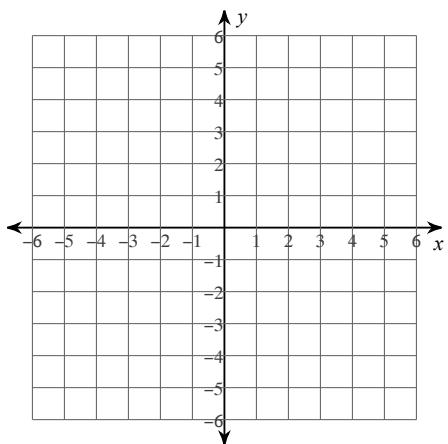
4) $x + 5y = -20$



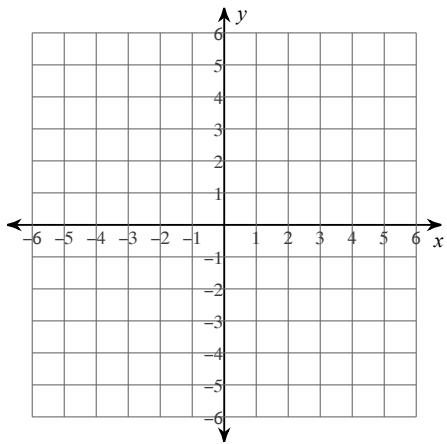
5) $y = \frac{4}{5}x$



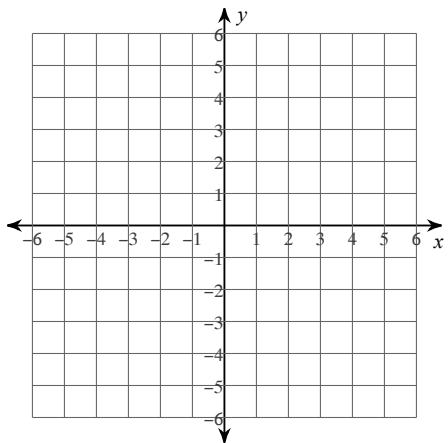
6) $y = x - 2$



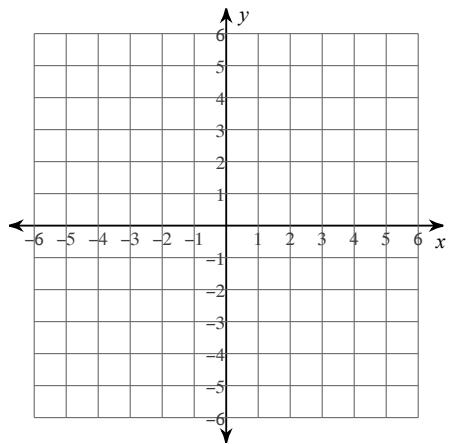
7) $y = -x - 5$



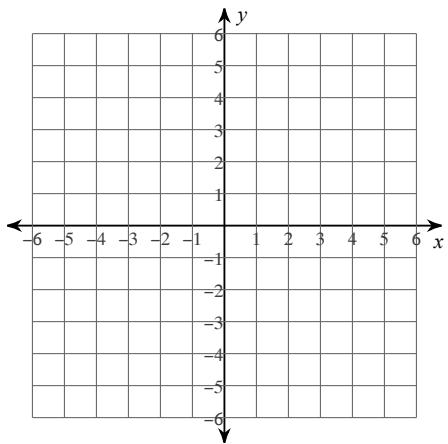
8) $y = -\frac{5}{2}x + 5$



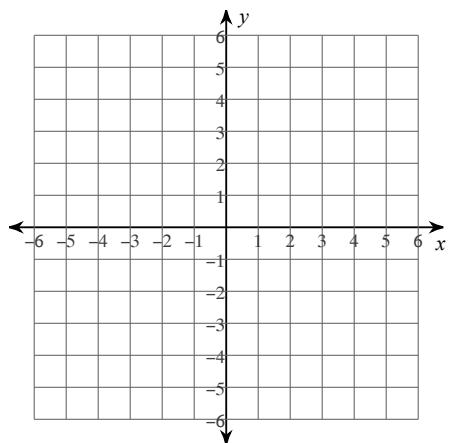
$$9) -75 + 24x = -15y$$



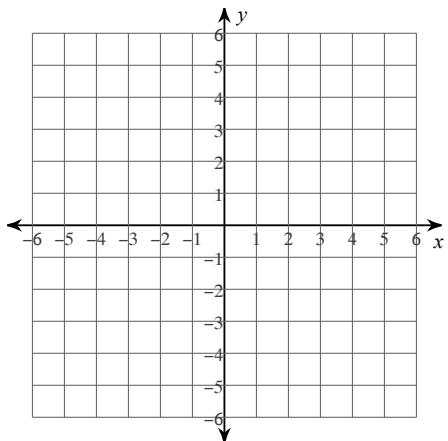
$$10) 1 = -y - 2x$$



$$11) 8 - x = -4y$$

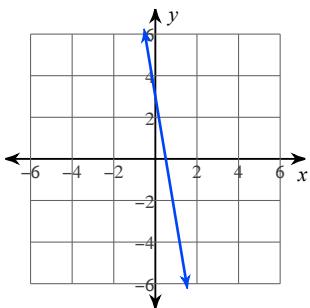


$$12) 3 + y = -x$$

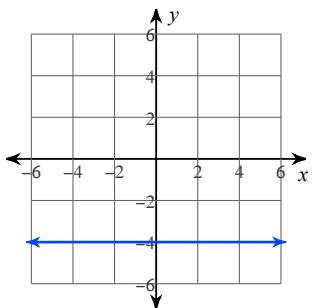


Answers to

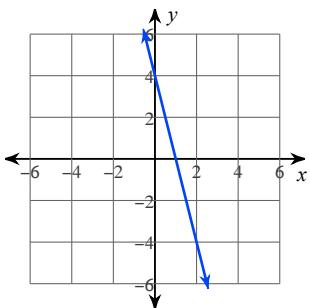
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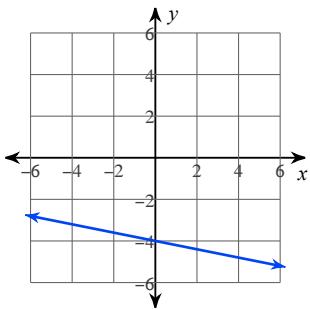
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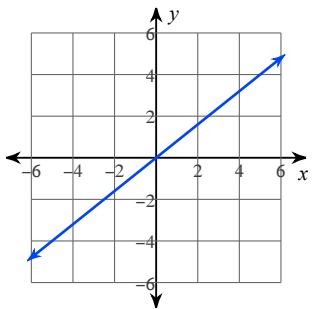
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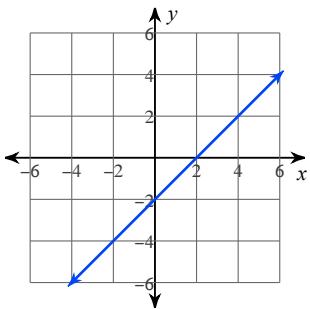
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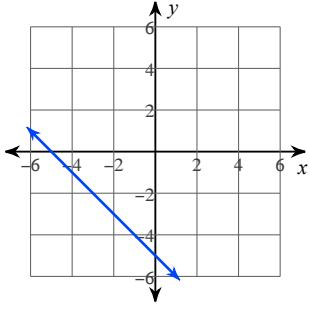
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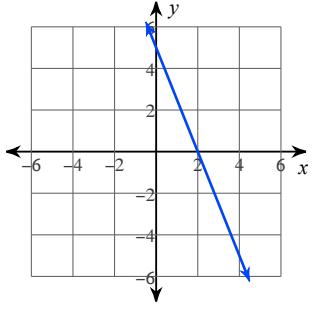
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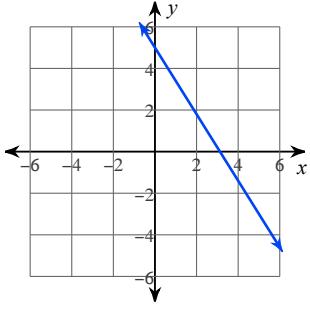
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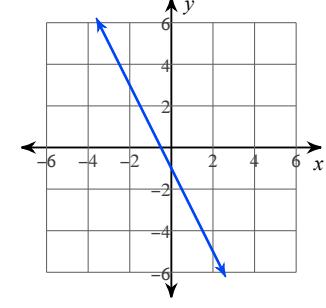
8)



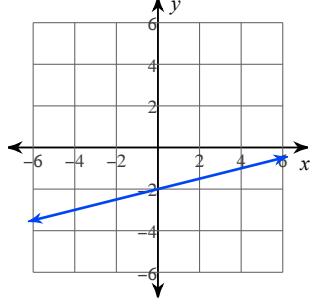
9)



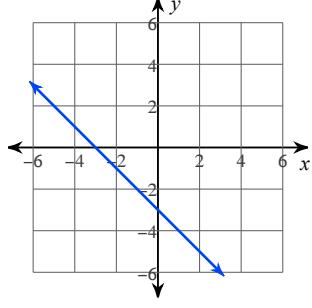
10)



11)



12)



Exponent Rules

Name _____

Simplify. Your answer should contain only positive exponents.

1) $3x \cdot 2x^{-3}y^4$

2) $3m^3 \cdot 3m^3n^{-3}$

3) $3a^3b^{-4} \cdot 2a^{-4}b^{-3}$

4) $x^{-4}y^2 \cdot x^{-4}$

5) $4x^4 \cdot 4x^2y^{-3} \cdot 4x^3$

6) $mn^{-4} \cdot 3m^3$

7) $4m^3n^{-1} \cdot m^{-3}$

8) $3u^3 \cdot 4v^{-4}$

Answers to

$$1) \frac{6y^4}{x^2}$$

$$5) \frac{64x^9}{y^3}$$

$$2) \frac{9m^6}{n^3}$$

$$6) \frac{3m^4}{n^4}$$

$$3) \frac{6}{b^7a}$$

$$7) \frac{4}{n}$$

$$4) \frac{y^2}{x^8}$$

$$8) \frac{12u^3}{v^4}$$

Simplifying Polynomials

Name _____

Divide.

1) $(2x^3 + 4x^2 + 2x) \div 4x$

2) $(9n^3 + 27n^2 + 18n) \div 9n^2$

3) $(24x^6 + 24x^5 + 40x^4) \div 8$

4) $(36p^3 + 3p^2 + 9p) \div 9p$

Simplify each expression.

5) $(8p^2 + 7p^4 - 2) - (1 + 3p^4 + 4p^2)$

6) $(6 - 6n - 6n^3) + (8n - 4n^3 - 1)$

7) $(7x^2 - 2x^4 - 7) + (3x^2 + 3 - 8x^4)$

8) $(1 - 2x^3 + x^4) + (3x^3 + 2x^4 - 7)$

9) $(6p^3 - 3 + 4p^2) + (8p^3 - 8p - 8p^2)$

10) $(4a + 8a^3 + 5a^2) + (6a - 3a^2 + 2a^3)$

Answers to

1) $\frac{x^2}{2} + x + \frac{1}{2}$

5) $4p^4 + 4p^2 - 3$

9) $14p^3 - 4p^2 - 8p - 3$

2) $n + 3 + \frac{2}{n}$

6) $-10n^3 + 2n + 5$

10) $10a^3 + 2a^2 + 10a$

3) $3x^6 + 3x^5 + 5x^4$

7) $-10x^4 + 10x^2 - 4$

4) $4p^2 + \frac{p}{3} + 1$

8) $3x^4 + x^3 - 6$

Systems of Equations

Name _____

Solve each system by graphing.

$$\begin{aligned} 1) \quad & 5x - 3y = 9 \\ & x + 3y = 9 \end{aligned}$$

$$\begin{aligned} 2) \quad & x - y = -1 \\ & 2x + 3y = -12 \end{aligned}$$

$$\begin{aligned} 3) \quad & 5x - y = -1 \\ & x - y = 3 \end{aligned}$$

$$\begin{aligned} 4) \quad & 2x + y = 2 \\ & x - 2y = 6 \end{aligned}$$

$$\begin{aligned} 5) \quad & 3x + 2y = 8 \\ & x + 4y = -4 \end{aligned}$$

$$\begin{aligned} 6) \quad & x - y = -4 \\ & 5x + 2y = -6 \end{aligned}$$

$$\begin{aligned} 7) \quad & x - 3y = -6 \\ & 2x - y = 3 \end{aligned}$$

$$\begin{aligned} 8) \quad & x = 2 \\ & 3x + 2y = -2 \end{aligned}$$

Answers to

1) $(3, 2)$

5) $(4, -2)$

2) $(-3, -2)$

6) $(-2, 2)$

3) $(-1, -4)$

7) $(3, 3)$

4) $(2, -2)$

8) $(2, -4)$

Solving and Graphing Quadratics

Name _____

Solve each equation by factoring.

1) $x^2 = 48 + 2x$

2) $x^2 + 3 = -4x$

3) $x^2 - 16 = 6x$

4) $x^2 + 11x = -24$

5) $7v^2 + 30v + 8 = 0$

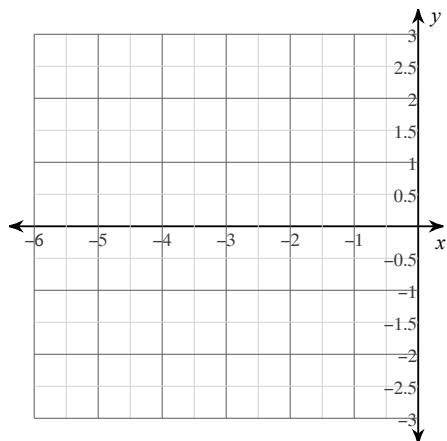
6) $3x^2 + 4x - 7 = 0$

7) $5x^2 + 27x - 56 = 0$

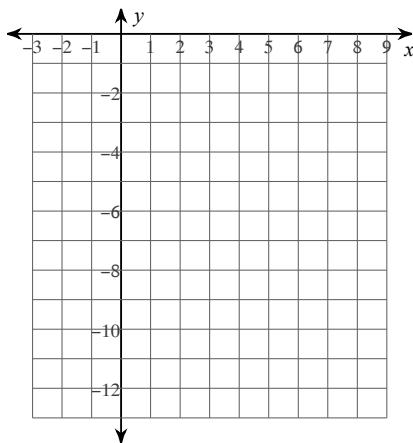
8) $3n^2 + 28n + 49 = 0$

Sketch the graph of each function.

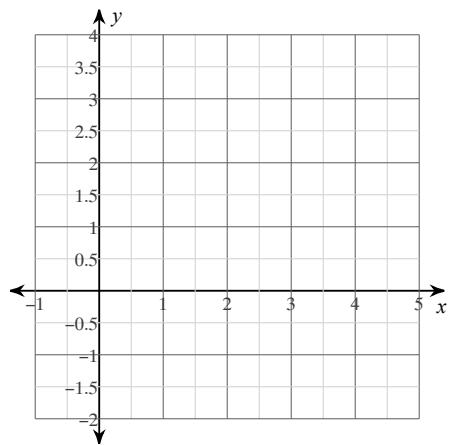
9) $y = (x + 2)^2 - 2$



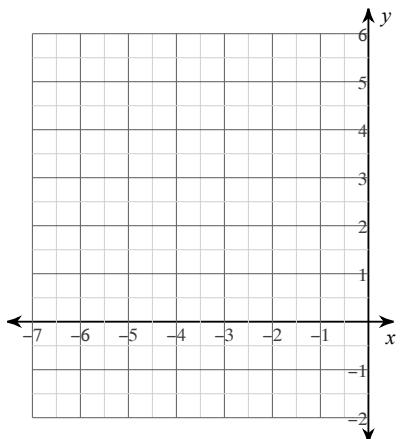
10) $y = -2(x - 1)^2 - 4$



$$11) \quad y = -(x - 2)^2 + 3$$

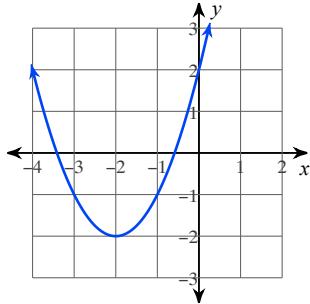


$$12) \quad y = -\frac{1}{2}(x + 4)^2 + 3$$

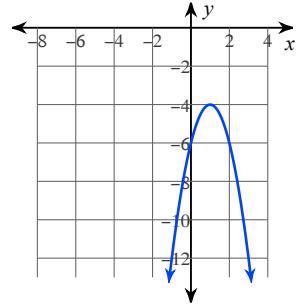


Answers to

1) $\{8, -6\}$
 5) $\left\{-\frac{2}{7}, -4\right\}$
 9)



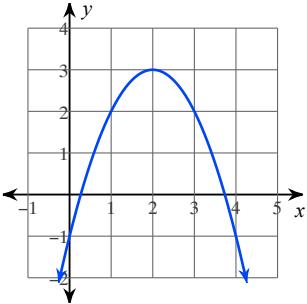
2) $\{-3, -1\}$
 6) $\left\{-\frac{7}{3}, 1\right\}$
 10)



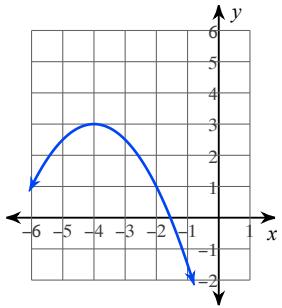
3) $\{-2, 8\}$
 7) $\left\{\frac{8}{5}, -7\right\}$

4) $\{-8, -3\}$
 8) $\left\{-\frac{7}{3}, -7\right\}$

11)



12)



Writing and Solving Linear Equations

Name _____

- 1) Rob left the White House at the same time as Jose. They drove in opposite directions. Jose drove at a speed of 55 km/h. After three hours they were 225 km apart. How fast did Rob drive?
- 2) Jack left school traveling toward the desert one hour before Wilbur. Wilbur traveled in the opposite direction going 20 km/h faster than Jack for four hours after which time they were 485 km apart. What was Jack's speed?
- 3) A metal alloy weighing 1 oz. and containing 60% silver is melted and mixed with 3 oz. of a different alloy which contains 80% silver. What percent of the resulting alloy is silver?
- 4) For his birthday party Matt mixed together 6 gal. of Brand A fruit punch and 7 gal. of apple juice. If Brand A contains 22% fruit juice, then what percent of the final mixture is fruit juice?

Solve each question. Round your answer to the nearest hundredth.

- 5) It takes Emily 12 hours to pick forty bushels of apples. Paul can pick the same amount in 15 hours. If they worked together how long would it take them?
- 6) Working alone, Ryan can pick forty bushels of apples in 14 hours. Jenny can pick the same amount in 8 hours. If they worked together how long would it take them?

Answers to

1) 20 km/h
5) 6.67 hours

2) 45 km/h
6) 5.09 hours

3) 75%

4) 64%

Factoring

Name _____

Factor each completely.

1) $p^2 - p$

2) $k^2 + 3k$

3) $3v^2 - 30v + 48$

4) $p^2 + 5p - 50$

5) $25m^2 - 20m + 4$

6) $25k^2 - 10k + 1$

7) $r^2 + 6r + 9$

8) $n^2 - 10n + 25$

9) $a^2 - 3a$

10) $x^2 + 13x + 30$

11) $-6n^2 - 54n - 84$

12) $b^2 - 12b + 35$

13) $3m^2 - 15m - 108$

14) $x^2 + 12x + 32$

15) $-6v^2 + 36v - 30$

16) $-6p^2 + 6p + 336$

Answers to

1) $p(p - 1)$

5) $(5m - 2)^2$

9) $a(a - 3)$

13) $3(m - 9)(m + 4)$

2) $k(k + 3)$

6) $(5k - 1)^2$

10) $(x + 10)(x + 3)$

14) $(x + 4)(x + 8)$

3) $3(v - 2)(v - 8)$

7) $(r + 3)^2$

11) $-6(n + 2)(n + 7)$

15) $-6(v - 1)(v - 5)$

4) $(p - 5)(p + 10)$

8) $(n - 5)^2$

12) $(b - 5)(b - 7)$

16) $-6(p - 8)(p + 7)$