

Algebra 2  
Unit 1, Day 1– Combining Like Terms

Name: \_\_\_\_\_  
Period: \_\_\_\_\_ Date: \_\_\_\_\_

**Simplify the following expressions completely.**

1.  $(-3)^2$                       2.  $(-2)^3$                       3.  $-5^2$                       4.  $(8x - 5) + (4x - 6)$

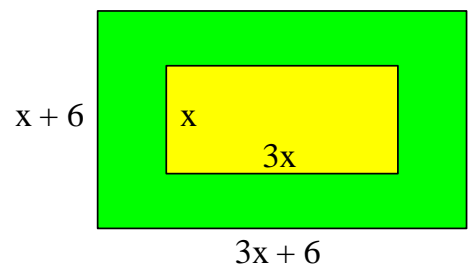
5.  $(6t + 1)(t - 2)$                       6.  $(2k + 11) - (4 - 7k)$                       7.  $(x^2 - x + 9) - (5x^2 + 5x - 7)$                       8.  $(3r - 5)^2$

9.  $2a - 3(a + 5)$                       10.  $(x - 3)^3$                       11.  $(2a - 5)(a^2 - 4a + 1)$

12. If the length of a rectangle can be represented as  $2x - 3$  and the width is  $4x + 5$ , write an expression that represents the perimeter of the rectangle.

13. Write the expression that represents the area of the rectangle above.

14. Kurtis is building a walkway that surrounds a rectangular garden. The shaded area in the picture represents this walkway. Write an expression that represents the area of the walkway using the information provided.



**Solve the following equations.**

1.  $x + 5 = 7$

2.  $6 > w - 7$

3.  $-11 = b - 9$

4.  $187 < -17r$

5.  $\frac{m}{2} = 14$

6.  $\frac{3}{2}k \geq 18$

7.  $\frac{8}{5}x = \frac{4}{15}$

8.  $3x + 7 \leq 19$

9.  $5h + 4 > 19$

10.  $7d - 1 < 13$

11.  $17 = \frac{w}{5} + 13$

12.  $\frac{b}{2} - 9 = 11$

13. What is the first step you can take to solve the equation  $6 + \frac{x}{3} = -2$ ?

a) Subtract 2 from each side

b) Add 6 to each side

c) Divide each side by 3

d) Subtract 6 from each side

14. A skateboarding park charges \$7 per session to skate and \$4 per session to rent safety equipment. Jared rents safety equipment every time he skates. During one year, he spends \$99 for skating charges and equipment rentals. Which equation can be used to find  $x$ , the number of sessions Jared attended?

a)  $99 = 7x$

b)  $99 = 7x + 4x$

c)  $99 = 7x + 4$

d)  $99 = 4x + 7$

15. A dance academy charges \$24 per class and a one-time registration fee of \$15. A student paid a total of \$687 to the academy. Find the number of classes the student took.

**Solve the following equations.**

1.  $\frac{1}{2} - y \geq \frac{2}{3}$

2.  $5 = 5 - 2x$

3.  $1.1 = 3x - 2.5$

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

5.  $7x - 13 - x = 32$

6.  $4a - 13 = 7a + 20$

7.  $\frac{1}{2}x + 4 \leq -\frac{2}{3}x + \frac{1}{2}$

8.  $5(2-x) \geq 3 - 2x + 7 - 3x$

9.  $13 + 6x = 6x + 1$

10.  $38 = 4(2f - 3) - 3f$

11.  $5(3y + 2) - 6 > 15y + 4$

**Solve the following formulas for the variable indicated.**

12.  $y = mx + b$ ; solve for  $x$

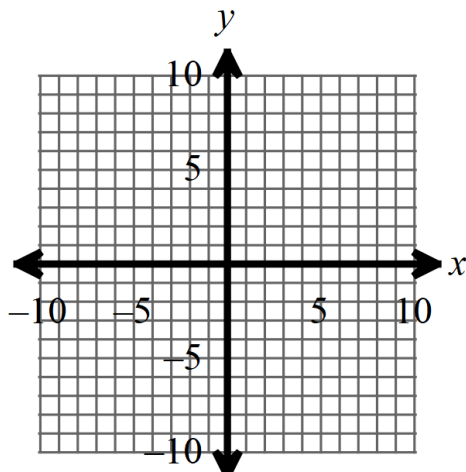
13.  $z = \frac{x-m}{s}$ ; solve for  $x$

14. The volume of a pyramid is given by the formula  $V = \frac{1}{3}b^2h$ , where  $V$  is the volume of the pyramid,  $b$  is the length of one side of the base, and  $h$  is the height of the pyramid. Rewrite the equation so that it would give you the height of the pyramid, for a known volume and base length.

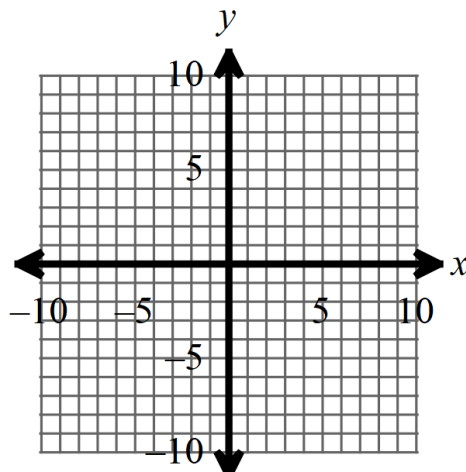
15. You have two summer jobs. In the first job, you work 25 hours per week and earn \$7.75 per hour. In the second job, you earn \$6.25 per hour and can work as many hours as you want. you want to earn \$250 per week. How many hours must you work at the second job? (**You must write the equation(a) and solve it(b)**)

**Graph the following functions.**

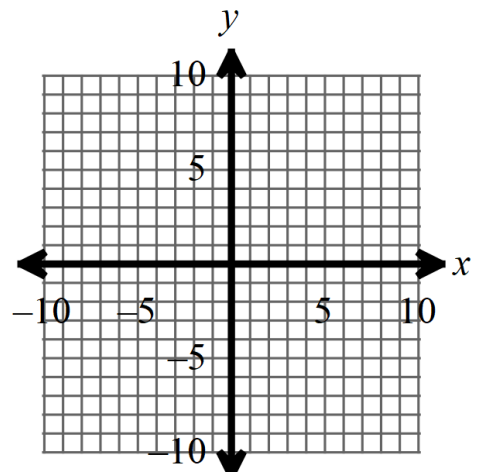
1.  $y = 3x - 7$



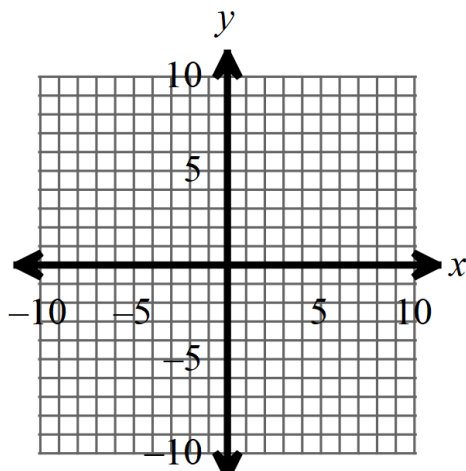
2.  $f(x) = -\frac{x}{3} + 8$



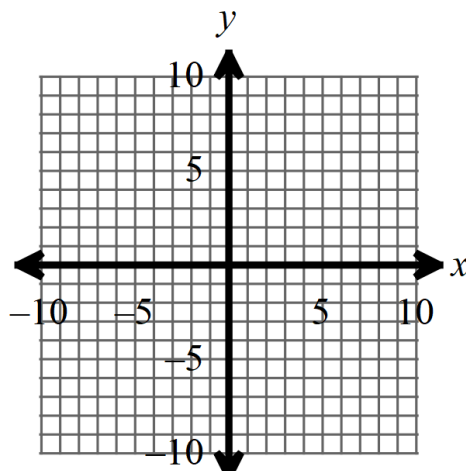
3.  $\frac{1}{2}y = 2x$



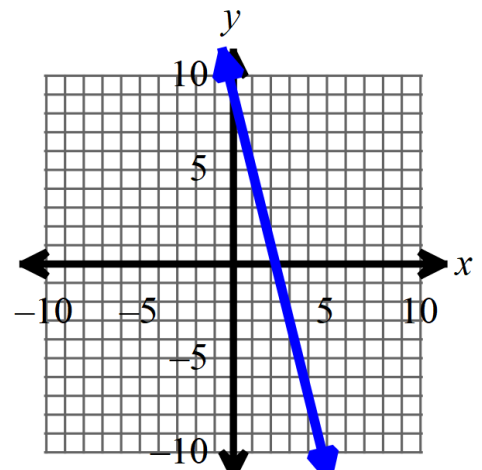
4.  $3x - 4y = 12$



5.  $2x = 16$



6. Write the equation for graph below.



7. The line with slope  $= -3$  passing through  $(5, 1)$

8. A line with  $m = -2$  passing through  $(0, 2)$

9. The line that goes through  $(6, 1)$  and  $(3, 3)$ .

10. A line with an x-intercept of  $-2$ , and a y-intercept of  $6$

Algebra 2 – Unit 1 – Day 5

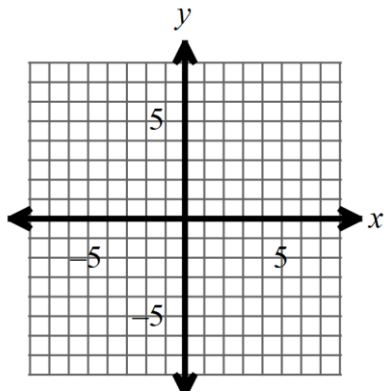
Solve Systems by Graphing and Substitution

Name: \_\_\_\_\_

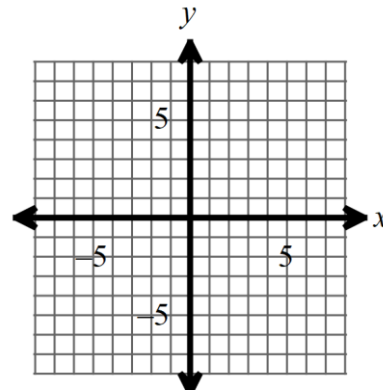
Period: \_\_\_\_\_ Date: \_\_\_\_\_

**Solve the following systems of equations by graphing.**

1.  $y = x - 1$  and  $x + y = 3$



2.  $y = 2x$  and  $2x + 5y = -12$



**Solve the following systems of equations by substitution.**

3.  $y = 4x$  and  $x + y = 5$

4.  $3x - y = 4$  and  $2x - 3y = -9$

5.  $x + 3y = 8$  and  $2x - 4y = -9$

6.  $x + 14y = 84$  and  $-x - 14y = -7$

7.  $4x - 2y = -60$  and  $5x - 3y = -78$

8.  $y + 2x = 2$  and  $y + x = 1$

Algebra 2 – Unit 1 – Day 6  
Solve Systems by Elimination

Name: \_\_\_\_\_  
Period: \_\_\_\_\_ Date: \_\_\_\_\_

**Solve the following systems of equations by elimination.**

1.  $-x + 2y = 12$  and  $x + 6y = 20$

2.  $2x + 5y = 14$  and  $4x + 5y = 8$

3.  $x + y = 1$  and  $x - 2y = 2$

4.  $2x + 5y = 3$  and  $-x + 3y = -7$

5.  $y = -2x + 8$  and  $y = -3x + 13$

6.  $2x - y = 6$  and  $-2x + y = 15$

7.  $-2x + 7y = -2$  and  $2x - 7y = 2$

8.  $y = 9x - 35$  and  $5x + 8y = 28$

9.  $-5x + 8y = 29$  and  $7x + 3y = 2$

10.  $9x + 8y = 7$  and  $18x - 15y = 14$

Solve the following problems and check for extraneous solutions

1.  $|3x - 2| = 23$

2.  $|x - 3| = 10$

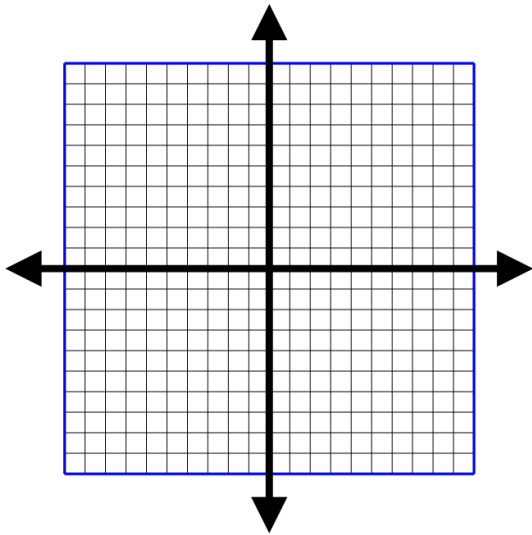
3.  $-|3x - 4| - 12 = 10$

4.  $3|4x - 3| + 12 = 27$

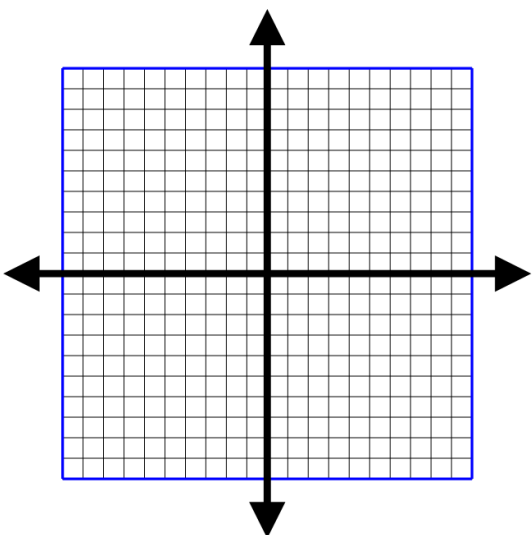
5.  $|2x + 5| = 3x$

Graph the following absolute value functions

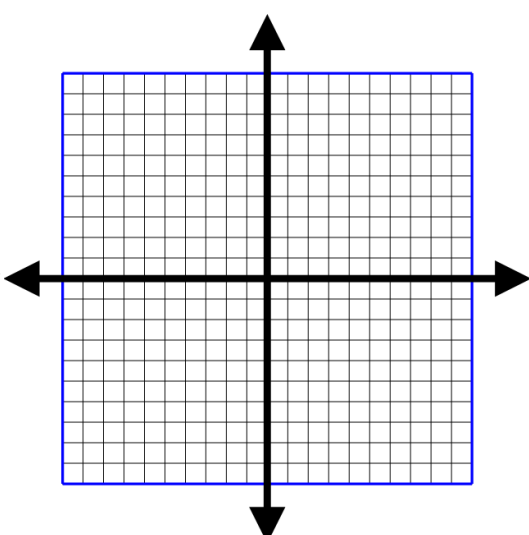
6.  $y = |x + 5|$



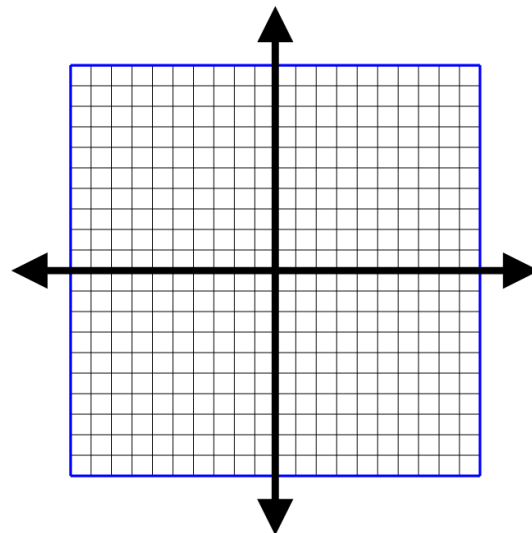
7.  $y = |x| + 5$



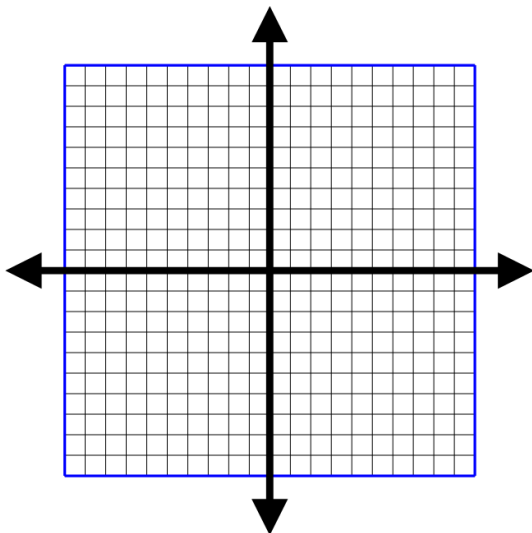
8.  $y = |x + 4| - 2$



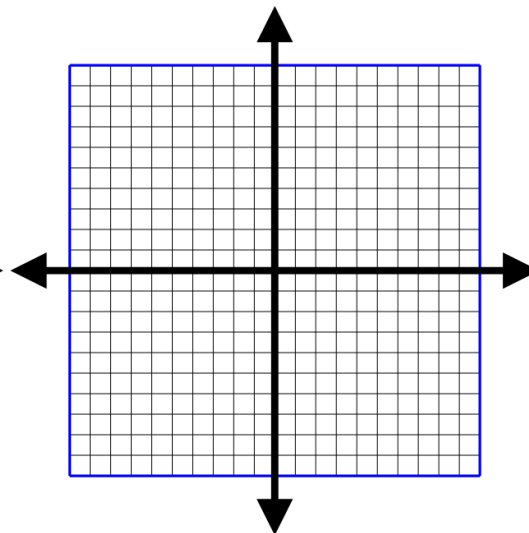
9.  $y = -\frac{1}{2}|x - 2| + 5$



10.  $y = -3|x|$



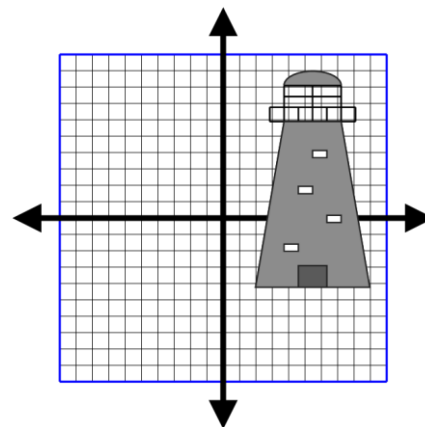
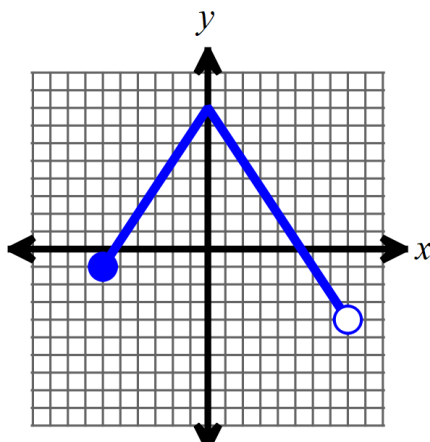
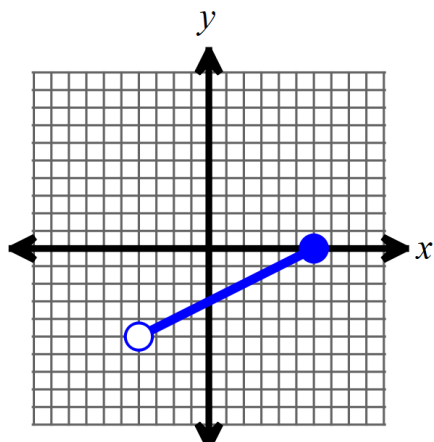
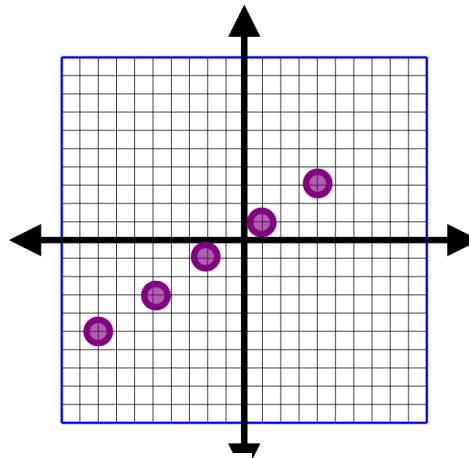
11.  $y = -4|x + 2| + 3$



Given the following information, find the domain and range for the following.

1.  $(1,6), (2,-7), (-1,8), (8,-3)$

2.



3. Domain: \_\_\_\_\_

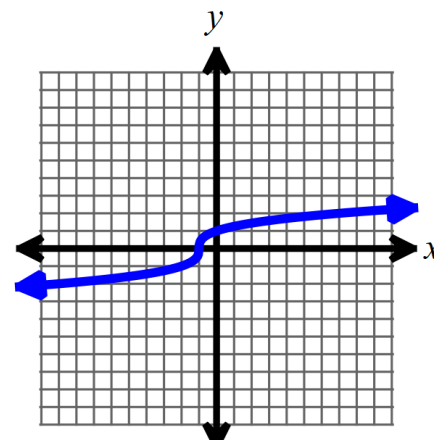
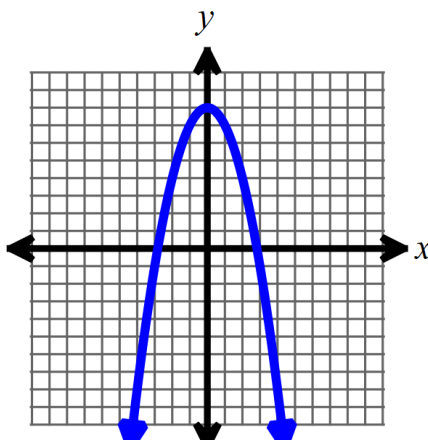
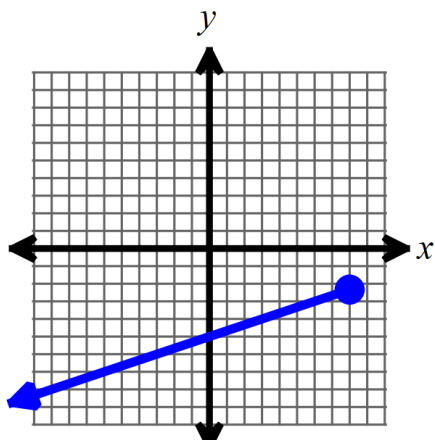
4. Domain: \_\_\_\_\_

5. Domain: \_\_\_\_\_

Range: \_\_\_\_\_

Range: \_\_\_\_\_

Range: \_\_\_\_\_



6. Domain: \_\_\_\_\_

7. Domain: \_\_\_\_\_

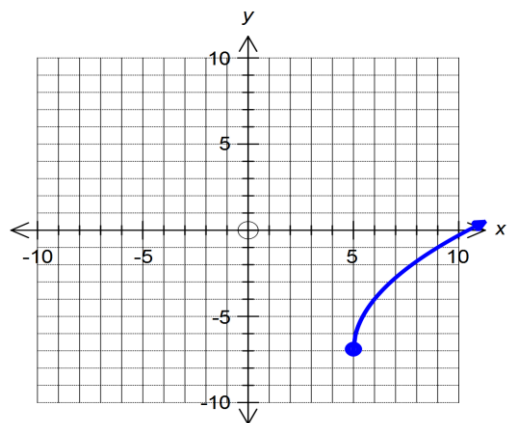
8. Domain: \_\_\_\_\_

Range: \_\_\_\_\_

Range: \_\_\_\_\_

Range: \_\_\_\_\_





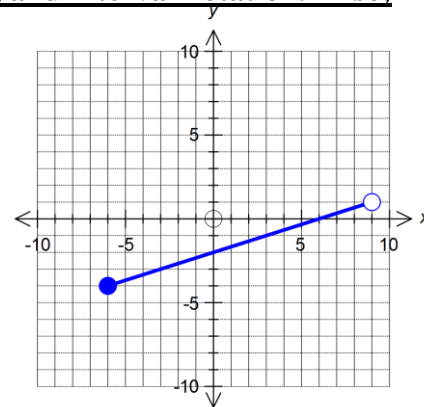
9. Domain: \_\_\_\_\_ Range: \_\_\_\_\_

10. Eric wants to buy T-shirts for homecoming. It costs \$20 for a design fee, and each T-shirt is \$5. Eric knows that the amount of money it costs to produce the homecoming T-shirts is dependent on the number of T-shirts he orders. Write a function for Eric, and then state the domain and range of that function.

**Given the following graph, write the domain and range in inequality, set, and interval notation. Also, describe using words.**

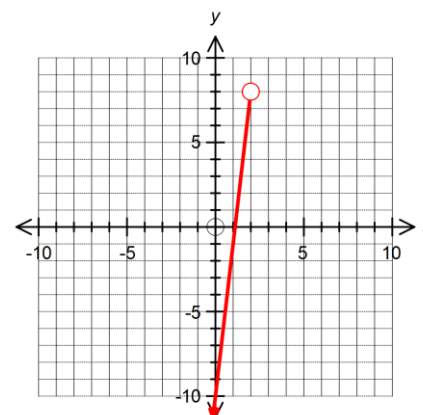
1.

|   | In words | Inequality | Set | Interval |
|---|----------|------------|-----|----------|
| D |          |            |     |          |
| R |          |            |     |          |



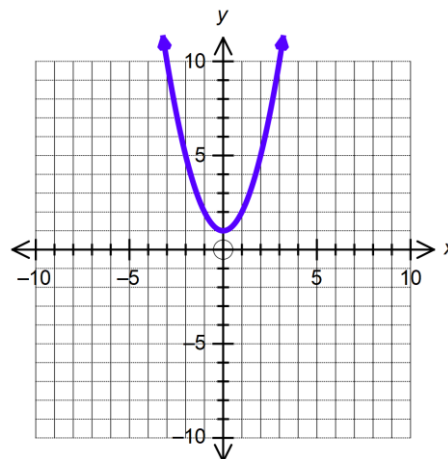
2.

|   | Inequality | Set | Interval |
|---|------------|-----|----------|
| D |            |     |          |
| R |            |     |          |



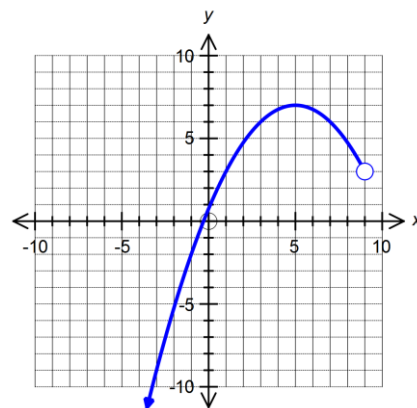
3.

|   | Inequality | Set | Interval |
|---|------------|-----|----------|
| D |            |     |          |
| R |            |     |          |



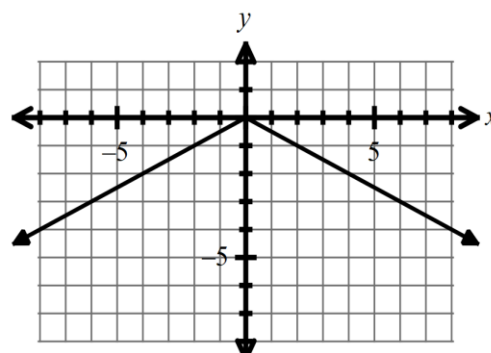
4.

|          | Inequality | Set | Interval |
|----------|------------|-----|----------|
| <b>D</b> |            |     |          |
| <b>R</b> |            |     |          |



5. Given the graph of  $f(x)$  below, which of the following statements are true? Select all that apply.

- A. The rate of change over the interval  $(0, \infty)$  is  $-\frac{1}{2}$ .
- B. The domain is  $(-\infty, \infty)$ .
- C. The domain is  $(-\infty, 0]$ .
- D. The range is  $(-\infty, \infty)$ .
- E. The range is  $(-\infty, 0]$ .
- F. The function  $f(x) = -\frac{1}{2}|x|$  represents the graph.



6. The table below shows the fees for renting a boat at the lake. What is the domain and range of the function?

|            |                |                |                |                 |
|------------|----------------|----------------|----------------|-----------------|
| Hours, $x$ | $0 < x \leq 2$ | $2 < x \leq 4$ | $4 < x \leq 8$ | $8 < x \leq 10$ |
| Cost, $y$  | \$350          | \$500          | \$800          | \$1000          |

- A. D:  $\{x | 0 < x \leq 10\}$   
R:  $\{y | 350 \leq y \leq 1000\}$
- B. D:  $\{x | 0 < x \leq 10\}$   
R:  $\{350, 500, 800, 1000\}$
- C. D:  $\{0, 2, 4, 8, 10\}$   
R:  $\{y | 350 \leq y \leq 1000\}$
- D. D:  $\{0, 2, 4, 8, 10\}$   
R:  $\{350, 500, 800, 1000\}$

Algebra 2 – Unit 1 – Day 10  
Graph Piecewise Functions – Restricted Domains

Name: \_\_\_\_\_

Period: \_\_\_\_\_ Date: \_\_\_\_\_

Evaluate the piecewise functions given the following domains.

$$h(x) = \begin{cases} x+5, & \text{if } x \leq -1 \\ -3x+1, & \text{if } x > -1 \end{cases}$$

1) when  $x = 1$

2) for  $h(-3)$

3) when  $x = -1$

$$g(x) = \begin{cases} \frac{1}{2}x + \frac{3}{4}, & \text{if } x < -1 \\ x^2 - 1, & \text{if } -1 \leq x < 4 \\ \sqrt{3x+4}, & \text{if } x \geq 4 \end{cases}$$

4) when  $x = 4$

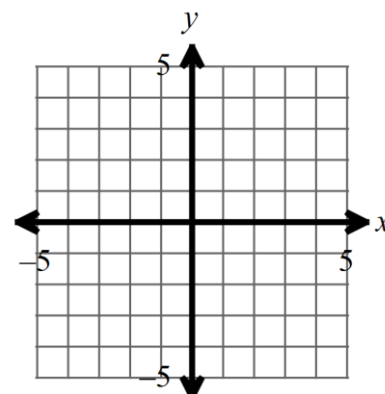
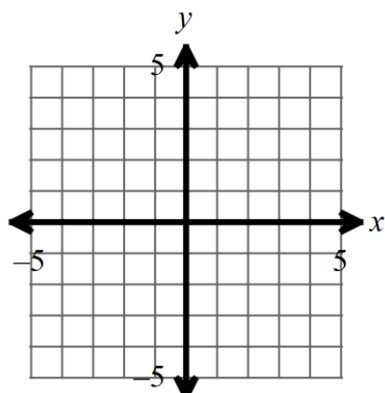
5) when  $x = -\frac{5}{2}$

6)  $g(-1)$

7)  $g(\pi)$

8)  $g(x) = \begin{cases} 2x, & \text{if } x < 0 \end{cases}$

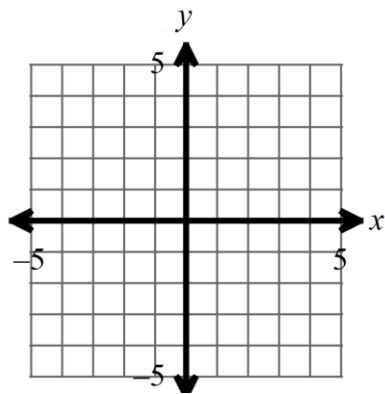
9)  $f(x) = \begin{cases} -x+3, & \text{if } x > 0 \end{cases}$



Use the graph to evaluate  $g(-2)$  \_\_\_\_\_

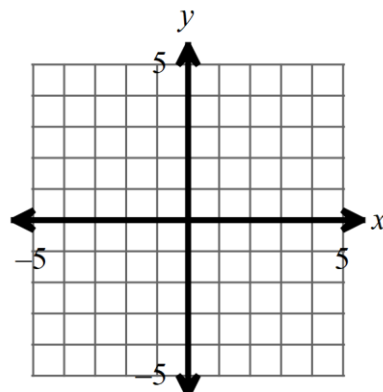
Use the graph to evaluate the function at  $x = 4$  \_\_\_\_\_

10)  $f(x) = \begin{cases} 4, & \text{if } x \leq -1 \end{cases}$



Evaluate the function at  $x = 0$  \_\_\_\_\_

11)  $g(x) = \begin{cases} 2 - x, & \text{if } x > 1 \end{cases}$



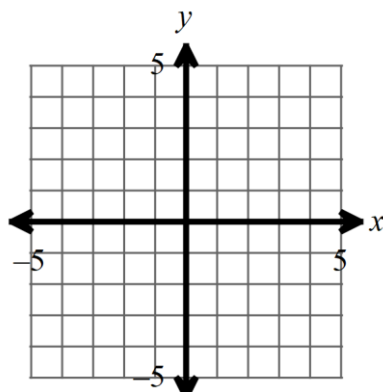
Evaluate the function at  $g(3)$  \_\_\_\_\_

Algebra 2 – Unit 1 – Day 11  
Graph Piecewise Functions – Part 2

Name: \_\_\_\_\_  
Period: \_\_\_\_\_ Date: \_\_\_\_\_

Graph the following piecewise functions. Then evaluate the function to find the given value.

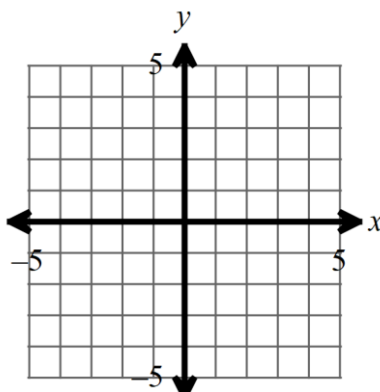
$$1) f(x) = \begin{cases} -\frac{1}{2}x - 2, & \text{if } x < 0 \\ \frac{1}{2}x, & \text{if } x \geq 0 \end{cases}$$



Evaluate the function at  $x = -2$

\_\_\_\_\_

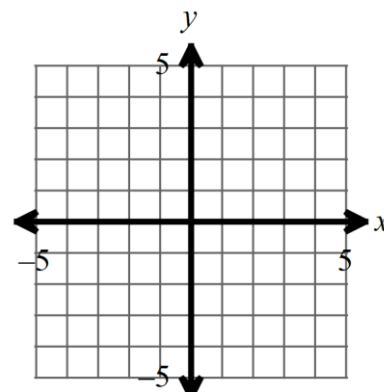
$$2) h(x) = \begin{cases} -2x - 1, & \text{if } x < 1 \\ x + 1, & \text{if } x \geq 1 \end{cases}$$



Evaluate the function at  $x = 1$

\_\_\_\_\_

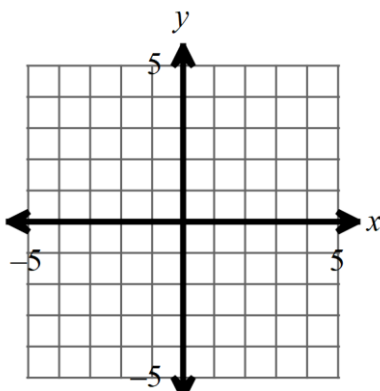
$$3) g(x) = \begin{cases} 3 - \frac{1}{2}x, & \text{if } x < 2 \\ -2, & \text{if } x \geq 2 \end{cases}$$



Evaluate the function at  $g(3)$

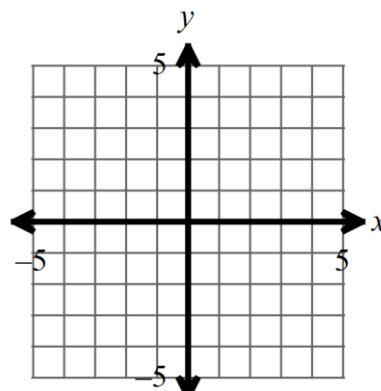
\_\_\_\_\_

$$4) f(x) = \begin{cases} x + 4, & \text{if } x < -1 \\ 3, & \text{if } -1 \leq x \leq 2 \\ -\frac{1}{2}x + 4, & \text{if } x > 2 \end{cases}$$



Evaluate the function at  $x = -4$  \_\_\_\_\_

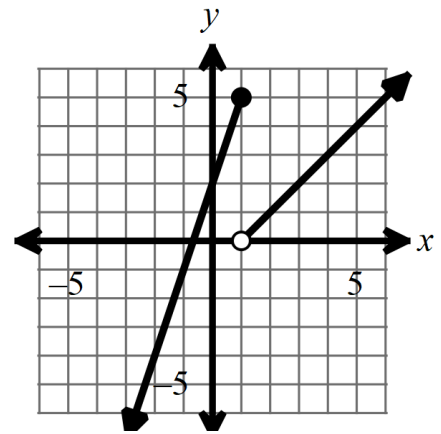
$$5) f(x) = \begin{cases} 3, & \text{if } x < -2 \\ x - 2, & \text{if } -2 \leq x < 3 \\ -x, & \text{if } x \geq 3 \end{cases}$$



Evaluate the function at  $f(4)$  \_\_\_\_\_

6. Which piecewise function is represented by the graph?

- A.  $f(x) = \begin{cases} 3x + 2, & x < 1 \\ x - 1, & x > 1 \end{cases}$
- B.  $f(x) = \begin{cases} 3x + 2, & x \leq 1 \\ x - 1, & x > 1 \end{cases}$
- C.  $f(x) = \begin{cases} 3x + 2, & x \geq 1 \\ x - 1, & x > 1 \end{cases}$
- D.  $f(x) = \begin{cases} x - 1, & x < 1 \\ 3x + 2, & x \geq 1 \end{cases}$



7. Which of the following piecewise functions represents the graph below?

- A.  $f(x) = \begin{cases} \frac{3}{2}x + 1, & x < -2 \\ 2x + 3, & -2 \leq x < 1 \\ -x + 2, & x \geq 1 \end{cases}$
- B.  $f(x) = \begin{cases} -\frac{3}{2}x + 1, & x < -2 \\ 2x + 3, & -2 \leq x < 1 \\ x + 2, & x \geq 1 \end{cases}$
- C.  $f(x) = \begin{cases} -\frac{3}{2}x + 1, & x \leq -2 \\ 2x + 3, & -2 < x \leq 1 \\ x + 2, & x > 1 \end{cases}$
- D.  $f(x) = \begin{cases} \frac{3}{2}x + 1, & x \leq -2 \\ 2x + 3, & -2 < x \leq 1 \\ -x + 2, & x > 1 \end{cases}$

