

Semester 1 Review

Evaluate each function.

1) $w(x) = -3x + 3$; Find $w(-7)$

24

2) $h(n) = -n^2 - 3n$; Find $h(n - 2)$

$-n^2 + n + 2$

Perform the indicated operation.

3) $h(a) = 3a - 2$

$g(a) = a^3 - a^2$

Find $h(a) + g(a)$

$a^3 - a^2 + 3a - 2$

4) $f(x) = 2x - 5$

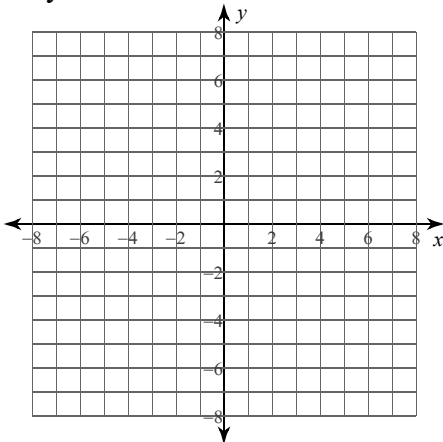
$g(x) = x^2 - x$

Find $f(x) - g(x)$

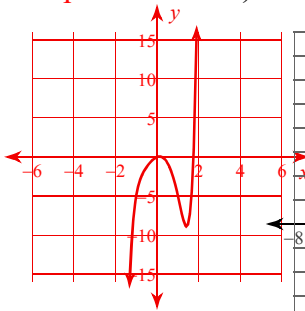
$-x^2 + 3x - 5$

Sketch the following. (Hint: Recall the vertical line test.)

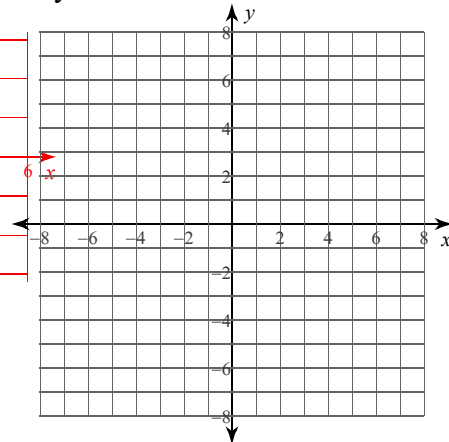
5) Any Function



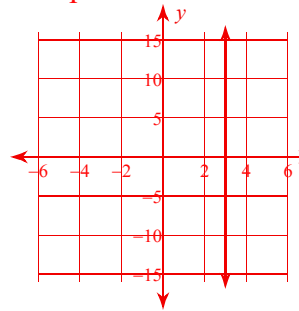
Sample:



6) Any Relation NOT a Function



Sample:



Complete.

7) A recipe for 6 cupcakes needs 1 cup of flour. The number of cupcakes you can make varies directly with the amount of flour. How many cupcakes can you make with 4 cups of flour?

24 cupcakes

8) Your wage varies directly with the hours you work. If you make \$16 in two hours, how long do you work to make \$80?

10 hours

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

9) through: $(-3, -1)$ and $(-2, 2)$

$$y = 3x + 8$$

10) through: $(-2, 3)$ and $(0, -1)$

$$y = -2x - 1$$

11) through: $(-5, 4)$ and $(1, 4)$

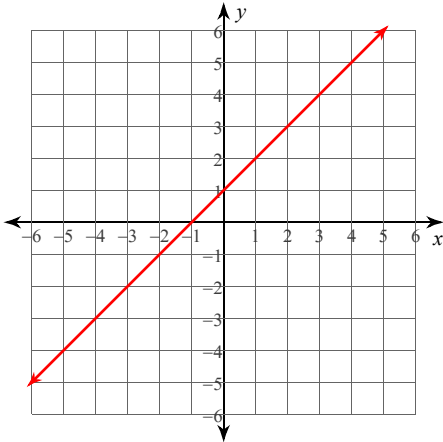
$$y = 4$$

12) through: $(3, 4)$ and $(3, 1)$

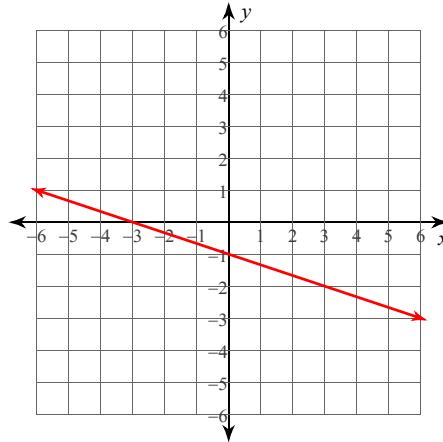
$$x = 3$$

Sketch the graph of each line.

13) $y = x + 1$



14) $x + 3y = -3$



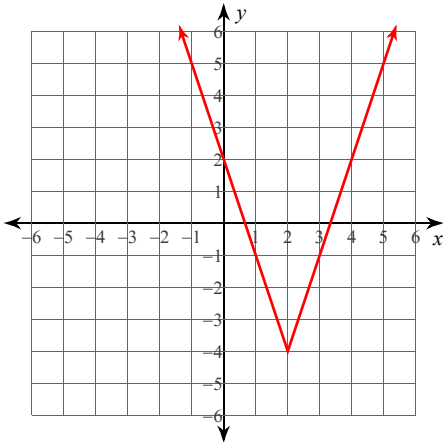
Complete.

15) A cab company charges a \$5 boarding rate in addition to its meter which is \$3 for every mile. What is the equation of the line that represents this cab company's rate? Let x = milage.

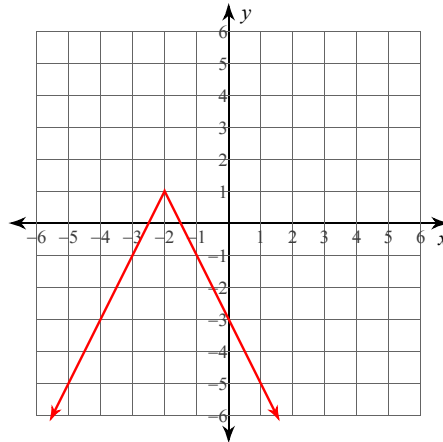
$y = 3x + 5$

Graph each equation by plotting the vertex, another point, and using symmetry.

16) $y = 3|x - 2| - 4$



17) $y = -2|x + 2| + 1$



- 18) Mofor's school is selling tickets to a play. On the first day of ticket sales the school sold 4 senior citizen tickets and 3 student tickets for a total of \$73. The school took in \$32 on the second day by selling 1 senior citizen ticket and 2 student tickets. What is the price each of one senior citizen ticket and one student ticket?

senior citizen ticket: \$10, student ticket: \$11

- 19) The senior classes at High School A and High School B planned separate trips to Yellowstone National Park. The senior class at High School A rented and filled 5 vans and 4 buses with 249 students. High School B rented and filled 5 vans and 7 buses with 387 students. Each van and each bus carried the same number of students. How many students can a van carry? How many students can a bus carry?

Van: 13, Bus: 46

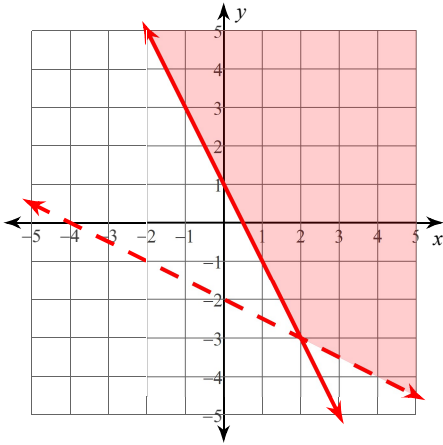
Does the system have one solution, infinitely many solutions, or no solution? (Hint: Putting both equations in slope-intercept form ($y = mx + b$), compare the slopes.)

20) $1 - \frac{5}{9}x = -\frac{1}{3}y$ Infinite number of solutions
 $9 - 5x = -3y$

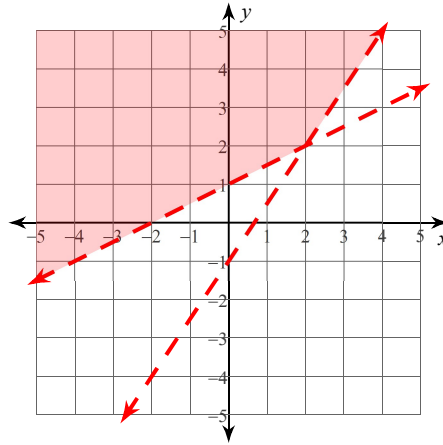
21) $-1 + \frac{1}{2}y = \frac{3}{4}x$ No solution
 $-6y + 9x = -6$

Sketch the solution to each system of inequalities.

22) $x + 2y > -4$
 $2x + y \geq 1$



23) $x - 2y < -2$
 $3x - 2y < 2$



Complete.

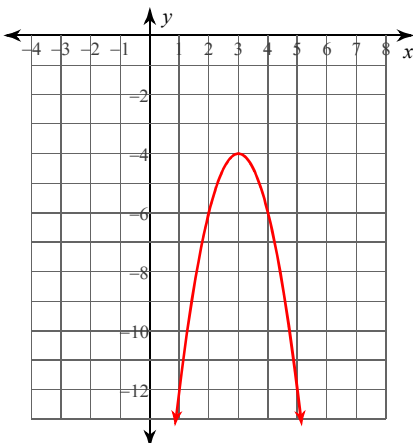
24) Arrange the following class data into a matrix and report the dimensions. Let columns be eye color and gender be rows.

For male students' eye color, there are nine brown, three blue, and two green. For female students' eye color, there are two brown, eleven blue, and four green.

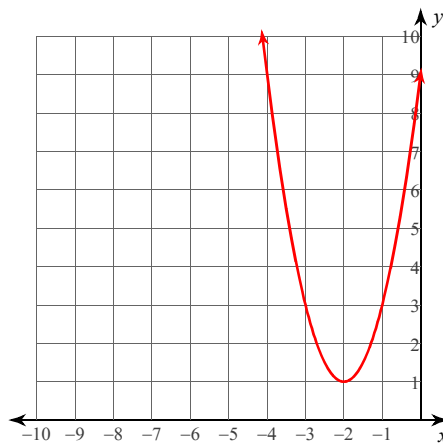
- A) $\begin{bmatrix} 9 & 2 \\ 3 & 11 \\ 2 & 4 \end{bmatrix}; 3 \times 2$ *B) $\begin{bmatrix} 9 & 3 & 2 \\ 2 & 11 & 4 \end{bmatrix}; 2 \times 3$
- C) $\begin{bmatrix} 9 & 3 & 2 \\ 2 & 11 & 4 \end{bmatrix}; 3 \times 2$ D) $\begin{bmatrix} 9 & 2 \\ 3 & 11 \\ 2 & 4 \end{bmatrix}; 2 \times 3$

Sketch the graph of each function.

25) $y = -2(x - 3)^2 - 4$



26) $y = 2(x + 2)^2 + 1$



Use the information provided to write the vertex form equation of each parabola. (Hint: Use completing the square.)

27) $y = -2x^2 - 8x - 4$

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

28) $y = 2x^2 - 40x + 210$

$$y = 2(x - 10)^2 + 10$$

Complete.

29) The height (h) in feet of an object above the ground is given by $h = -16t^2 + 64t + 190$, where t is the time in seconds. Find the maximum height of the object. (Hint: Put the equation in vertex form.)

254 feet

Factor each completely.

30) $3x^2 - 192$

$$3(x - 8)(x + 8)$$

31) $18n^2 - 132n + 240$

$$6(3n - 10)(n - 4)$$

Solve each equation by factoring.

32) $4b^2 = 36$

$$\{-3, 3\}$$

33) $3x^2 + 24 = -18x$

$$\{-2, -4\}$$

$$34) 10v^2 + 12 = -34v$$

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

$$35) 9x^2 + 39x = -12$$

$$\left\{-\frac{1}{3}, -4\right\}$$

Solve each equation by completing the square.

$$36) 2a^2 - 16a = 40$$

$$\{10, -2\}$$

$$37) 6x^2 + 5 = -12x$$

$$\left\{\frac{-6 + \sqrt{6}}{6}, \frac{-6 - \sqrt{6}}{6}\right\}$$

Solve each equation with the quadratic formula.

$$38) 2x^2 = -5x + 18$$

$$\left\{2, -\frac{9}{2}\right\}$$

$$39) 3a^2 - 1 = -4a$$

$$\left\{\frac{-2 + \sqrt{7}}{3}, \frac{-2 - \sqrt{7}}{3}\right\}$$

Simplify.

$$40) (-2 + 5i) + (8 + 4i)$$

$$6 + 9i$$

$$41) (7 + i) - (-6 - 3i)$$

$$13 + 4i$$

$$42) (-3 + i)(1 + 5i)$$

$$-8 - 14i$$

$$43) (-8 - i)^2$$

$$63 + 16i$$

Find the absolute value of each complex number.

$$44) \quad |-3i|$$

3

$$45) \quad |3 + 3i|$$

$3\sqrt{2}$

Find the discriminant of each quadratic equation then state the number and type of solutions.

$$46) \quad 4p^2 + 4 = 0$$

-64 ; two complex solutions

$$47) \quad -3r^2 + 4 = -r$$

49 ; two real solutions

$$48) \quad 4n^2 = 4n - 1$$

0 ; one real solution

Solve each equation with the quadratic formula.

$$49) \quad 2a^2 - 3a = -5$$

$$\left\{ \frac{3 + i\sqrt{31}}{4}, \frac{3 - i\sqrt{31}}{4} \right\}$$

$$50) \quad 4x^2 - 5x = -2$$

$$\left\{ \frac{5 + i\sqrt{7}}{8}, \frac{5 - i\sqrt{7}}{8} \right\}$$