

**HW: Equations/Inequalities with Two Variables**

1. Consider the linear equation  $y = 4x + 2$ .

a. Does the point (2, 10) lie on the graph of this equation? Justify your answer.

$$y = 4x + 2$$

$$10 = 4(2) + 2$$

$$10 = 8 + 2$$

$$10 = 10 \checkmark$$

**yes**

b. Does the point (-1, 4) lie on the graph of this equation? Justify your answer.

$$y = 4x + 2$$

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

$$4 = -4 + 2$$

$$4 \neq -2 \times$$

**no**

2. The equation  $y = 2x^2 - x + 5$  describes a **parabola**. Does the point (3, 20) lie on its graph? Justify how you found your answer.

$$y = 2x^2 - x + 5$$

$$20 = 2(3)^2 - (3) + 5$$

$$20 = 2(9) - 3 + 5$$

$$20 = 18 - 3 + 5$$

$$20 = 15 + 5$$

$$20 = 20 \checkmark$$

**yes**

3. Determine for each of the following inequalities whether the point given lies on its graph.

a. (4, 1) for  $y > 2x - 5$

$$1 > 2(4) - 5$$

$$1 > 8 - 5$$

$$1 > 3$$

**no**

b. (2, 8) for  $x + y \leq 10$

$$2 + 8 \leq 10$$

$$10 \leq 10$$

**yes**

c. (3, 2) for  $y < x^2 - 4$

$$2 < (3)^2 - 4$$

$$2 < 9 - 4$$

$$2 < 5$$

**yes**

d. (-6, -1) for  $y > \frac{x+12}{3}$

$$-1 > \frac{-6+12}{3}$$

$$-1 > \frac{6}{3}$$

$$-1 > 2$$

**no**

4. Determine if the point (4, 7) is a solution to the system of equations below. Justify your answer.

$$y = 2x - 1$$

$$y = \frac{1}{2}x + 5$$

$$7 = 2(4) - 1$$

$$7 = 8 - 1$$

$$7 = 7$$

$$7 = 7 \checkmark$$

$$y = \frac{1}{2}x + 5$$

$$7 = \frac{1}{2}(4) + 5$$

$$7 = 2 + 5$$

$$7 = 7 \checkmark$$

yes

5. The point (4, 20) lies on the line  $y = mx + 8$ , for some value of  $m$ .

a. If  $m = 2$ , will the point (4, 20) lie on the line?

$$y = mx + 8$$

$$20 = (2)(4) + 8$$

$$20 = 8 + 8$$

$$20 \neq 16 \quad \boxed{\text{no}}$$

b. Find the value of  $m$  for which the point (4, 20) will lie on the line.

$$y = mx + 8$$

$$20 = m(4) + 8$$

$$20 = 4m + 8$$

$$\begin{array}{r} -8 \\ \hline 12 = 4m \end{array}$$

$$\frac{12}{4} = \frac{4m}{4}$$

$$\boxed{m = 3}$$