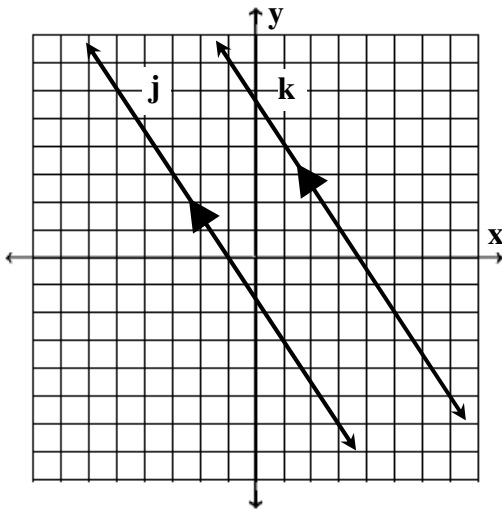


### Section 3.4 – Slopes of Parallel and Perpendicular Lines and Constructing Equations

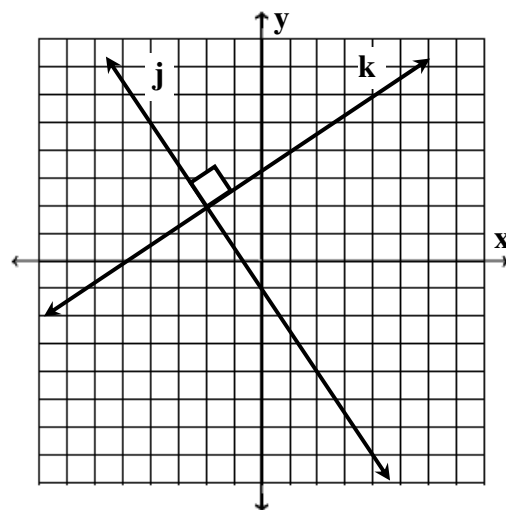
Find the slope of lines j and k.



$m_j = \underline{\hspace{2cm}}$        $m_k = \underline{\hspace{2cm}}$

**Question 1:**

What do you notice about the slopes of the parallel lines j and k?



$m_j = \underline{\hspace{2cm}}$        $m_k = \underline{\hspace{2cm}}$

**Question 1:**

What do you notice about the slopes of the perpendicular lines j and k?

**Question 2:**

What is the result when multiplying the slopes of the perpendicular lines j and k?

**Slopes of Parallel Lines**

If two lines are parallel, then their slopes are \_\_\_\_\_.

If  $j \parallel k$ , then  $m_j = m_k$

**Slopes of Perpendicular Lines**

If two lines are perpendicular, then their slopes are \_\_\_\_\_.

If  $j \perp k$ , then  $m_j = \frac{a}{b}$  and  $m_k = -\frac{b}{a}$

**Important:**  $(m_j)(m_k) = -1$ .

### Strategy for Constructing an Equation

1. Write out the general slope-intercept equation  $y = mx + b$ . Find the values of **m** and **b**.
2. Determine the slope, **m**, based on the equation and condition already given and plug the value for **m** in the equation you are constructing.
3. Plug in the x- and y-coordinates of the point given to solve for the y-intercept, **b**. Then plug **b** back into the equation that only has the value for **m**. You're done!

**Important:** The y-intercept of the equation given is NOT used for anything when constructing an equation.

#### Ex 1:

- a) Write an equation of the line that passes through the point  $(-2, 6)$  and is parallel to the line formed by the equation  $y = -x + 3$ .
- b) Write an equation of the line that passes through the point  $(2, -1)$  and is parallel to the line formed by the equation  $y = \frac{1}{2}x + 3$ .

#### Ex 2:

- a) Write an equation of the line that passes through the point  $(0, 3)$  and is perpendicular to the line formed by the equation  $y = \frac{1}{2}x - 1$ .
- b) Write an equation of the line that passes through the point  $(-4, 2)$  and is perpendicular to the line formed by the equation  $y = -4x - 3$ .