

## Algebra 1 - 4.3 Follow-up Lesson

### Writing Equations of Parallel and Perpendicular Lines

• Slope & y-intercept : slope intercept form  $y = mx + b$

Point & Slope : point slope form  $y - y_1 = m(x - x_1)$

So far we've learned how to write equations if we are given (or can find) either group of information above. Today's lesson is just an extension of that.

Ex 1: Write the equation of the line that passes through (9, -4) and is perpendicular to a line that has a slope of 5

Point (9, -4)      Slope opposite reciprocal of 5.  $-\frac{1}{5}$

Put in Point-Slope form since we know point & slope.

$$y - y_1 = m(x - x_1)$$
$$y - (-4) = -\frac{1}{5}(x - 9)$$
$$y + 4 = -\frac{1}{5}(x - 9)$$

Ex 2: Write the equation of the line that has a y-intercept of -2 and is parallel to the function  $y = \frac{7}{3}x + 19$

y-int: -2      Slope

Same slope as  $y = \frac{7}{3}x + 19$       slope intercept form

so  $m = \frac{7}{3}$

Use slope intercept form:  $y = \frac{7}{3}x - 2$

Ex 3: Two lines are perpendicular. The first line has an equation of

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

The second line has a y-intercept of 13.

What is the equation of the second line?

Given info:

y-int 13      slope of perpendicular line  $-\frac{1}{3}$

so slope of 2nd line is 3.      opposite reciprocal.

$$y - y_1 = m(x - x_1)$$

Equation of 2nd Line:  $y = 3x + 13$

Ex 4:  $f(x)$  and  $g(x)$  are parallel.  $f(x) = -7$ .  $g(x)$  passes through the point  $(-11, 4)$ . Write an equation for  $g(x)$ .

$g(x)$  info

Point  $(-11, 4)$

Point slope form:  
 $y - 4 = 0(x - -11)$

$y - 4 = 0$   
 $+4 \quad +4$   
 $y = 4$

Solve for  $y$ .

our answer needs to start w/  $g(x) =$

$g(x) = 4$

$f(x) = -7$   
 is like  $y = -7$

" $y =$ " Lines are horizontal. so slope is 0.

Same slope as  $f(x)$  so slope is 0.

Ex 5: Two lines K and M are perpendicular. K passes through  $(2, 3)$  and  $(-4, 1)$ . M passes through  $(6, 0)$ . Write an equation for M.

M's info:

Point  $(6, 0)$

Perpendicular to slope of  $\frac{1}{3}$   
 so opposite reciprocal  
 $-3$

Find slope of K.  
 Slope formula  
 $\frac{y_2 - y_1}{x_2 - x_1} = \frac{1 - 3}{-4 - 2} = \frac{-2}{-6} = \frac{1}{3}$

Equation for M.  
 $y - 0 = -3(x - 6)$   
 $y = -3(x - 6)$

Homework:

### 4.3 Follow Up Worksheet