

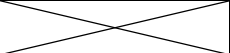
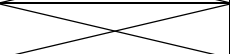
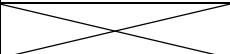
6-6 Writing equations given a variety of information

2 lines are parallel if they have the same slope. The symbol that represents parallel is \parallel

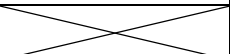
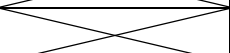
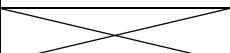
2 lines are perpendicular if they have negative reciprocal slopes. The symbol that represents perpendicular is \perp

Example: Write an equation in slope-intercept form that is \parallel to $4y = 3x - 12$ and passes through $(-8, 7)$.

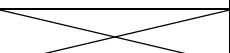
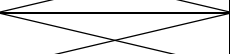
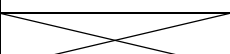
Construct the following table in order to organize your thoughts:

Provided	Use	Need
$m =$	$m =$	$m =$
	$x =$	$b =$
	$y =$	

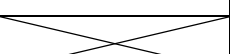
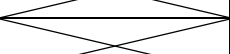
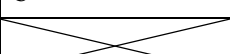
The slope (m) is provided in the problem's equation. The equation we were given is $4y = 3x - 12$. We have to get it in slope-intercept form in order to determine the slope (m). After dividing every term by 4, we get the slope (m) using $y = \frac{3}{4}x - 3$. Therefore we know that $m = \frac{3}{4}$. That is the "Provided Slope". So fill it into the chart.

Provided	Use	Need
$m = \frac{3}{4}$	$m =$	$m =$
	$x =$	$b =$
	$y =$	

Next, we have to determine what slope we should use to find the answer. Since the line is parallel to the equation given, we know we use the SAME slope because [parallel lines have the same slope](#). Therefore

Provided	Use	Need
$m = \frac{3}{4}$	$m = \frac{3}{4}$	$m =$
	$x =$	$b =$
	$y =$	

From the problem given, we know that the line must pass through the ordered pair $(-8, 7)$. Since an ordered pair is written in the form (x, y) , we know the following:

Provided	Use	Need
$m = \frac{3}{4}$	$m = \frac{3}{4}$	$m =$
	$x = -8$	$b =$
	$y = 7$	

In order to write an equation in slope-intercept form we need to know the slope (m) and the y-intercept (b). So, we will always write whatever we have for the USE SLOPE as the NEED SLOPE.

Provided	Use	Need
$m = \frac{3}{4}$	$m = \frac{3}{4}$	$m = \frac{3}{4}$
 	$x = -8$	$b =$
 	$y = 7$	

Then in order to find the y-intercept (b), we will use the information from the USE column plugging m, x, and y into $y = mx + b$ to solve for b.

Provided	Use	Need
$m = \frac{3}{4}$	$m = \frac{3}{4}$	$m = \frac{3}{4}$
 	$x = -8$	$b =$
 	$y = 7$	

So,

$$y = mx + b$$

$$7 = \frac{3}{4}(-8) + b$$

$$7 = -6 + b$$

$$+6 \quad +6$$

$$13 = b$$

And we fill in the table.

Provided	Use	Need
$m = \frac{3}{4}$	$m = \frac{3}{4}$	$m = \frac{3}{4}$
 	$x = -8$	$b = 13$
 	$y = 7$	

Using the NEED column, we can write the equation.

Provided	Use	Need
$m = \frac{3}{4}$	$m = \frac{3}{4}$	$m = \frac{3}{4}$
 	$x = -8$	$b = 13$
 	$y = 7$	

So the answer is $y = \frac{3}{4}x + 13$

* If you are asked to find a line perpendicular, to $y = \frac{1}{3}x + 4$ through $(2, -14)$, your chart would look like this:

Provided	Use	Need
$m = \frac{1}{3}$	$m = -3$	$m = -3$
 	$x = 2$	$b =$
 	$y = -14$	

Remember, that perpendicular lines have negative reciprocal slopes, which is why the USE SLOPE is -3. Also, the USE SLOPE and the NEED SLOPE are always exactly the same. To finish use the USE column's information to find b, then use the information in the NEED column to get the answer.