

## Parallel lines 12.12.16

Welcome Back.  
Assessment return.

Graphing lines parallel.

In the previous section we had the scenario of no solutions. No solutions existed when lines did not cross. What do we call lines that do not cross? Parallel.

What quality do parallel lines share? They have the same slope.

So if I give the equation of a line parallel to  $y=2x+4$  through the point  $(8,1)$ .  
So if they are parallel they have the same...? So what is the slope that we need? 2.  
So if we have an x and a y can we create an equation of this line using  $y=mx+b$   
We plug it all in  $1=2(8)+b$  Solve for b  $b=-15$  So the equation of the line is  $y=2x-15$ .

Show steps again with the point  $(-1,-2)$  and  $y=-3x-2$ .

You try:  $(-2,4)$  parallel to  $y=\frac{1}{2}x+9$

## Perpendicular lines

In order for a line to be perpendicular it must be the opposite reciprocal. This means you multiply it by negative -1 and flip it. For example  $\frac{3}{4}$  turns into  $-\frac{4}{3}$ . So let's find the equation of a line through the point  $(-3,-2)$  and perpendicular to  $x+4y=12$ . First we should find the slope by getting y by itself. Which gives us the equation  $y=-\frac{1}{4}x+3$ . So what is the slope  $-\frac{1}{4}$  what is the slope times negative 1 and flipped over? 4. So we can use that 4 and create the new equation using our point.  $-2=4(-3)+b$   $b=10$ . So our new equation would be  $y=4x+10$ . We need to recognize that when it is perpendicular we should always use our new slope. This is usually the biggest error I see when I teach this.

You try:  $y=-\frac{1}{3}x+2$  through the point  $(6,0)$

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