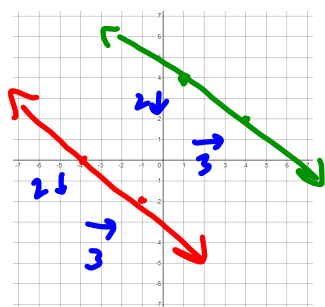


Algebra 1: 4.3 Parallel and Perpendicular Lines

What does it mean for two lines to be Parallel?

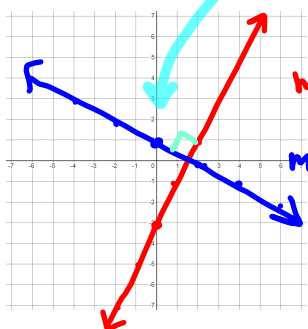
Draw an Example:



- They never touch
- Slopes are equal

What does it mean for two lines to be Perpendicular?

Draw an Example:



- 2 lines cross at a 90° Angle
- "They make a T"
- Slopes are opposite Reciprocals.

Vocab: Opposite: same # but with swapped Sign - or +

Reciprocal: flipped fraction, so $3/2 \rightarrow 2/3$

Vertical lines: Undefined Slope

Horizontal lines: Slope of 0

Horizontal & Vertical Lines are Perpendicular.

4.3 Writing Equations of Parallel and Perpendicular Lines

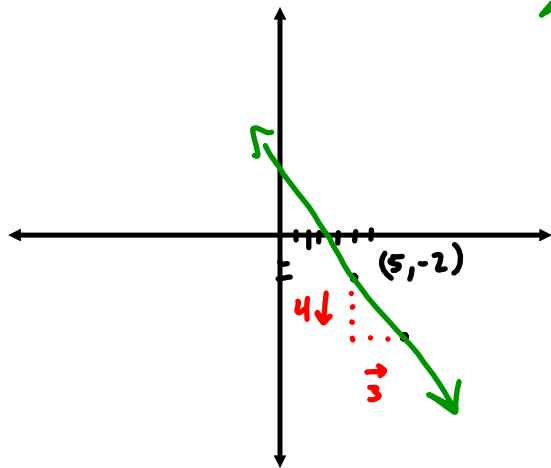
Ex: Complete the parts below:

Part a) Graph the line $y + 2 = -\frac{4}{3}(x - 5)$

This is in Point Slope form.

Part b) Create an equation for a second line that is parallel to the line from part a, but passes through $(-5, 9)$

Part c) Create an equation for a third line that is perpendicular to the line from part a, but passes through $(0, -3)$



a) $y - y_1 = m(x - x_1)$
 $y + 2 = -\frac{4}{3}(x - 5)$
 slope: $-\frac{4}{3}$
 Point: $(5, -2)$

b) Slope: $-\frac{4}{3}$ since it's parallel to part a's Equation.
 Parallel: Equal slope.

Point: $(-5, 9)$
 x_1, y_1

Equation:
 $y - 9 = -\frac{4}{3}(x - (-5))$
 $y - 9 = -\frac{4}{3}(x + 5)$

c) Slope: opposite reciprocal of $-\frac{4}{3}$. so... $\frac{3}{4}$
 point: $(0, -3)$

$$y - (-3) = \frac{3}{4}(x - 0)$$

$$y + 3 = \frac{3}{4}x$$

4.3 Writing Equations of Parallel and Perpendicular Lines

Ex: Line A and B are **parallel**. Line A has a slope of $-\frac{15}{2}$. Find the slope of Line B.

Slope of Line B **Parallel** = Slope of Line A

so the answer is : $-\frac{15}{2}$

Ex: Line J and K are perpendicular. Line K has a slope of -7 . Find the slope of Line J.

Slope of Line J is the **opposite Reciprocal** of Line K's slope.

$$-\frac{7}{1} \rightarrow \frac{1}{7}$$

Answer : $\frac{1}{7}$

4.3 Writing Equations of Parallel and Perpendicular Lines

Ex: Two lines are parallel. One of the lines crosses through (-3, -4) and (0, 8). What is the slope of the second line? x_1

y_1 find the slope: $\frac{y_2 - y_1}{x_2 - x_1} = \frac{8 - (-4)}{0 - (-3)} = \frac{12}{3} = 4$

Slope of 2nd Line: $\boxed{4}$

Since it is parallel (Equal Slope) to line 1.

Ex: Two lines are perpendicular. One line crosses through (7, 0) and (15, 10). What is the slope of the second line? x_1 y_1

x_2 y_2

Slope of Line one: $\frac{y_2 - y_1}{x_2 - x_1} = \frac{10 - 0}{15 - 7} = \frac{10}{8} = \frac{5}{4}$

Slope of 2nd Line: $\boxed{-\frac{4}{5}}$

opposite Reciprocal of

4.3 Writing Equations of Parallel and Perpendicular Lines

Homework:

4.2 Worksheet