



**Parallel and
Perpendicular Lines**

If a line is parallel to another then their slopes must be exactly the same. This is because the lines never intersect. (//)

examples:

$m: 4$ → $-1/4$

$-4/3$ → $3/4$

$1/7$ → -7

Find a line using an equation and a point.

Ex) Find a line that is parallel to $y = 2x - 3$ and goes through the point $(3, -4)$.

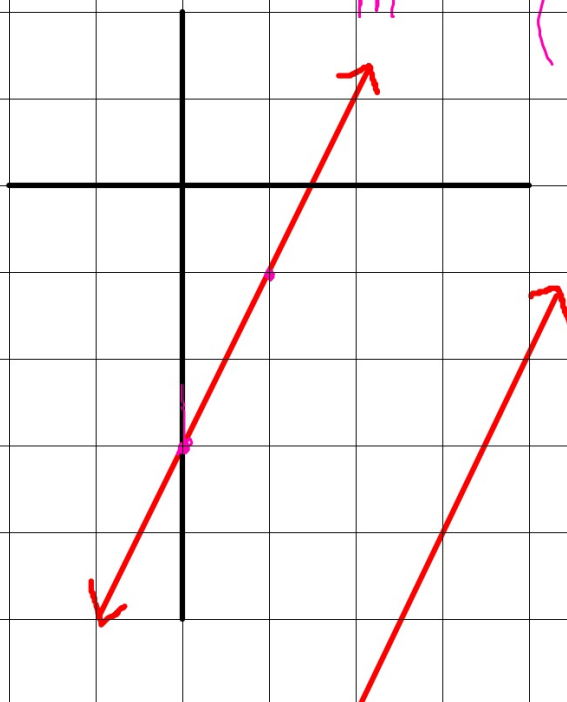
$$y = mx + b$$

$$-4 = 2(3) + b$$

$$-4 = 6 + b$$

$$-10 = b$$

$$y = 2x - 10$$



Find a line that is parallel to $4x + 3y = 10$
and goes through the point $(6, -3)$.

$$y = -4/3x + 5$$

$$y = mx + b$$

$$-3 = -4/3(6) + b$$

$$-3 = -8 + b$$

$$5 = b$$

Find a line that is parallel to $y = -1/3x - 2$
and goes through the point $(-3, 2)$.

$$y = -1/3x + 1$$

$$y = mx + b$$

$$2 = -1/3(-3) + b$$

$$2 = 1 + b$$

$$1 = b$$

WARM UP

1) Find a line that is parallel to $5x + -2y = 18$ and goes through the point $(7, -1)$.



2) Find a line that is parallel to $y = -3/5x - 8$ and goes through the point $(-3, 2)$.



Find the equation of the line that is...

$$y = 1/5x + 1 \quad // \quad (0, -3)$$

$$y = -1/4x + 2 \quad \perp \quad (2, 6)$$

If a line is perpendicular to another, then their slopes are opposite reciprocals or the multiplicative inverse.

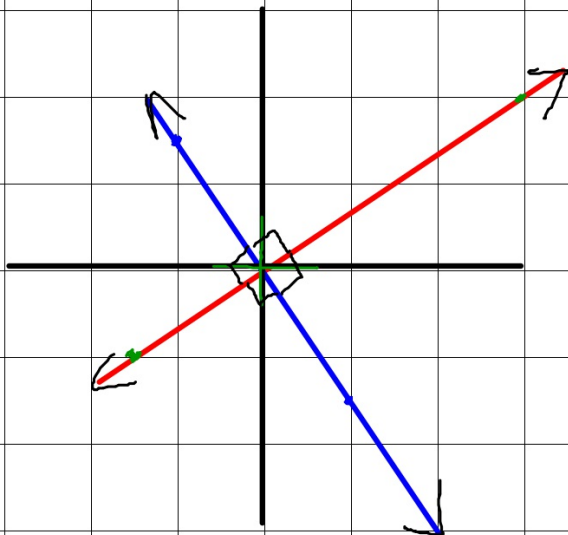
examples:

$m: 4 \rightarrow -1/4$

$-4/3 \rightarrow 3/4$

$1/7 \rightarrow -7$

Find a line perpendicular given an equation. (⊥)



Ex) $y = \frac{2}{3}x$

$y = -\frac{3}{2}x$

Warm Up

What is the slope of the line: $5x - 3y + 10 = 0$?

What is the slope of the line: $x = -2$?

What is the slope of the line: $y = 6$?

What is the y -intercept of the line: $2y = 9x + 11$?

$$1) \quad 4x - 3y = 12 \quad // \quad (4, -2)$$

$$y = 4/3x - 4$$

$$2) \quad y = 2/3x + 3 \quad \text{graph} \quad (0, 4)$$

$$y = -3/2x + 4$$

Steps:

- 1) Write in slope-intercept form
- 2) Decide on the slope needed
- 3) Find b by substituting the coordinates and the slope
- 4) Rewrite the equation

① $5x + 2y = 10$

Slope - Intercept



② $y =$ // $(-2, 3)$



③ $y =$ \perp $(+10, 1)$

④ $y = \frac{2}{5}x - 3$

Write in st form



Homework

① $4x + 5y = 20$ // $(5, 7)$

② $y = \frac{1}{2}x - 2$ h $(4, 6)$