

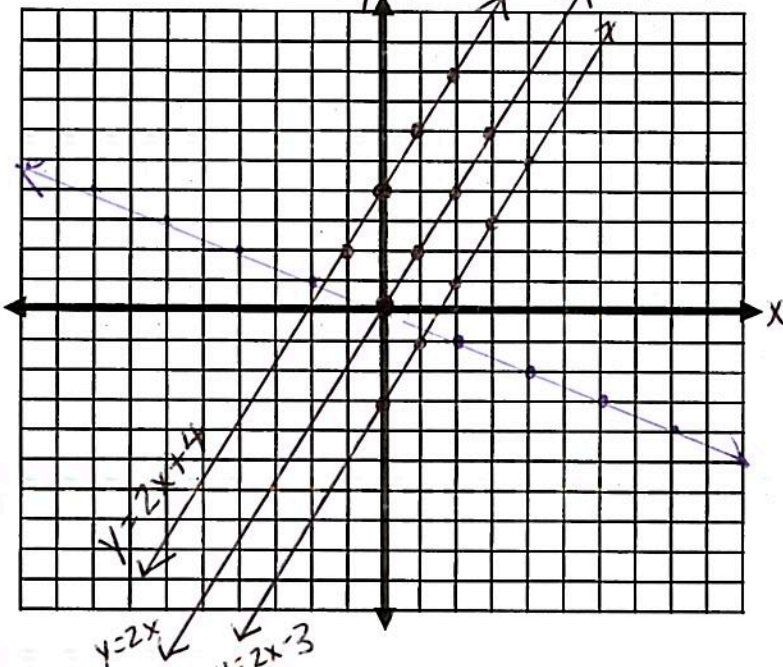
Algebra RH

Essential Question: How do we write the equation of a line?

Do Now:

On the same set of axes, graph the following 3 lines. Complete a - c.

$y = 2x$ slope = $\frac{2}{1}$ yint: 0
 $y = 2x - 3$ slope = $\frac{2}{1}$ yint: -3
 $y = 2x + 4$ slope = $\frac{2}{1}$ yint: 4



Think about this...

a) Compare and contrast the lines. What's the same? What's different?

same slope
different y-intercepts

b) Can a conclusion be made about the relationship of the lines and their slopes?

parallel lines
have equal slopes

c) Graph $y = -\frac{1}{2}x$ on the coordinate plane above.

Think about this...

- Do the lines intersect? In what way? yes perpendicular - they meet at a 90° angle
- What's the relationship between the slopes of the lines above and the slope of $y = -\frac{1}{2}x$?
opposite (signs) reciprocal (numerals) $m = \frac{2}{1}$ $m = -\frac{1}{2}$

Parallel Lines have the same slope

Symbol: ||

Perpendicular lines have opposite reciprocal slopes

Symbol: ⊥

Writing the Equation of a Line

- Find the slope $\left(\frac{\Delta y}{\Delta x}\right)$
- Find the y-intercept
- Substitute the values in $y = mx + b$

1. Write the equation of a line whose slope is -2 and y-intercept is 4.

slope = $m = -2$	y intercept = $b = 4$	equation
		$y = mx + b$
		$y = -2x + 4$

2. Write the equation of a line that is parallel to $2x - y = 4$ and that has the same y-intercept as $y = x$.

$2x - y = 4$ $-y = -2x + 4$ $y = 2x - 4$	slope = $m = 2$	y intercept = $b = 0$	equation
			$y = mx + b$
			$y = 2x$

3. Write the equation of a line that passes through the point $(-4, 3)$ and has a slope of 2.

slope = $m = 2$	y intercept = $b = 11$	equation
	$y = mx + b$	$y = mx + b$
	$3 = 2(-4) + b$	$y = 2x + 11$
	$3 = -8 + b$	
	$11 = b$	

4. Write the equation of a line that passes through $(-2, 4)$ and is perpendicular to the line $y - 2x = 4$.

slope = $m = -\frac{1}{2}$	y intercept = $b = 3$	equation
$y - 2x = 4$	$y = mx + b$	$y = -\frac{1}{2}x + 3$
$y = 2x + 4$	$4 = -\frac{1}{2}(-2) + b$	
$m = \frac{2}{1}$ new $m = -\frac{1}{2}$	$4 = 1 + b$ $b = 3$	

5. Write the equation of a line that passes through the points $(-3, 1)$ and $(0, -1)$.

slope = $m = -\frac{2}{3}$	y intercept = $b = -1$	equation
$\frac{\Delta y}{\Delta x} = \frac{1 - (-1)}{-3 - (0)} = \frac{2}{-3}$	$(0, -1)$	$y = -\frac{2}{3}x - 1$

6. Write the equation of a line with an x-intercept of 3 and a y-intercept of 2.

slope = $m =$	y intercept = $b =$	equation
$\frac{\Delta y}{\Delta x} = \frac{0 - (2)}{3 - (0)} = \frac{-2}{3}$	2	$y = -\frac{2}{3}x + 2$