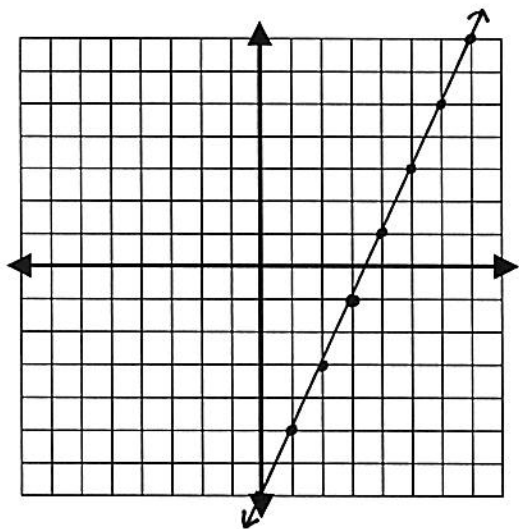


Essential Question: How do we write the equation of a line from a table and verbal description?

Do Now:

What is the equation of the line that passes through the point $(3, -1)$ and has a slope of 2?

Hint: Graph the line first!



$$m = 2$$

$$b = -7$$

$$y = 2x - 7$$

Writing the Equation of a Line using an Algebraic Approach

Step 1: Find the slope of the line

Step 2: Substitute the slope and one of the points (x, y) into $y = mx + b$

Step 3: Solve for b (y -intercept)

Step 4: Write the equation in slope-intercept form ($y = mx + b$)

Example: From the information given in the Do Now, write the equation of the line algebraically.

slope	y -intercept	equation
2	$(3, -1)$ $y = mx + b$ $-1 = 2(3) + b$ $-1 = 6 + b$ $-7 = b$	$y = 2x - 7$

1) Represent the equation of a line that passes through the coordinates (2,0) and (0,3).

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

2) Represent the equation of the line that passes through the coordinates (-3,7) and (3,3).

Slope	y-intercept	equation
$\frac{\Delta y}{\Delta x} = \frac{7-3}{-3-3}$ $= \frac{4}{-6} \rightarrow \boxed{-\frac{2}{3}}$	$(3,3) \quad y = mx + b$ $3 = -\frac{2}{3}(3) + b$ $3 = -2 + b$ $\boxed{5} = b$	$y = -\frac{2}{3}x + 5$

3) Write the equation of a line that is parallel to $4y = 4x - 20$ and passes through the point (-6,-3).

slope	y-intercept	equation
<p>parallel lines have same slope</p> $\frac{4y}{4} = \frac{4x-20}{4}$ $y = x - 5 \quad m = \boxed{1}$	$(-6,-3) \quad y = mx + b$ $-3 = 1(-6) + b$ $-3 = -6 + b$ $\boxed{3} = b$	$y = x + 3$

4) Write the equation of a line that runs through the points listed in the table below.

x	y
13	45
→ 14	50
15	55
→ 16	60

• choose any two points to find slope

slope	y-intercept	equation
$\frac{\Delta y}{\Delta x} = \frac{60-50}{16-14}$ $= \frac{10}{2} \rightarrow \boxed{5}$	$(14,50)$ $y = mx + b$ $50 = 5(14) + b$ $50 = 70 + b$ $\boxed{-20} = b$	$y = 5x - 20$

The **TAKEAWAY**

We can represent a linear relationship with an equation if we know the slope and y-intercept. With this information, we can write the equation in $y = mx + b$ form (slope-intercept form).