WRITE A LINEAR EQUATION FROM TWO POINTS

Linear functions can be represented in slope-intercept form:

$$y = mx + b$$

m: slope; b: y-intercept

If you're given two points that lie on a line, you can write the equation of the line in slope-intercept form.

Try it! Write the equation of the line that goes through the points (–3, 5) and (–4, –1).

Step 1: Find the slope between the two points.

Use the slope formula:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Plug in the coordinates, and simplify:

$$m = \frac{-1 - 5}{-4 - (-3)} = \frac{-6}{-1} = 6$$

So, the slope of the line is 6.

Step 2: Find the y-intercept of the line.

Plug the slope and either one of the points into $y = mx + b$, and solve for b:

$y = mx + b$

$y = 6x + b$ — *Plug in the slope you found, 6, for m.*

$5 = 6(-3) + b$ — *Plug in the coordinates of one of the points. Let's use x = –3 and y = 5.*

$5 = -18 + b$ — *Simplify. Then solve for b.*

$23 = b$

So, the y-intercept of the line is 23.

Step 3: Write the equation in slope-intercept form: $y = 6x + 23$.

Try it yourself! In each problem, you've been given a pair of points that lie on a line. Use the points to write the equation of the line in slope-intercept form.

1. Points: (2, 8) and (4, 14)

Equation: y = 3x + 2

2. Points: (1, 1) and (3, 11)

Equation: y = 5x – 4

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Keep going! In each problem, you've been given a pair of points that lie on a line. Use the points to write the equation of the line in slope-intercept form.

3. Points: (4, –4) and (10, 8)

Equation: $y = 2x - 12$

4. Points: (–2, 9) and (2, –7)

Equation: $y = -4x + 1$

5. Points: (–1, –5) and (–3, –25)

Equation: $y = 10x + 5$

6. Points: (6, 3) and (14, –1)

Equation: $y = -\frac{1}{2}x + 6$

7. Points: (5, 2) and (–5, –6)

Equation: $y = \frac{4}{5}x - 2$

8. Points: (–2, 1) and (4, 10)

Equation: $y = \frac{3}{2}x + 4$

9. Points: (4, –5) and (–8, –14)

Equation: $y = \frac{3}{4}x - 8$

10. Points: (–5, –3) and (–15, –7)

Equation: $y = \frac{2}{5}x - 1$