Question

Write a linear equation for the line going through the points $(-2, -87)$ and $(8, -7)$.

Write your equation in the form $y = kx + b$.

Solution

We have two defined points on the line – it means that we have two equations:

$$y_1 = kx_1 + b$$

$$y_2 = kx_2 + b$$

Subtract the first equation from the second one and factor out k:

$$y_2 - y_1 = k(x_2 - x_1)$$

Divide both sides by $x_2 - x_1 \neq 0$ ($x_1 = -2, x_2 = 8$)

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

Plug in $x_1 = -2, x_2 = 8, y_1 = -87, y_2 = -7$ into the previous formula:

$$k = \frac{-7 - (-87)}{8 - (-2)} = \frac{-7 + 87}{8 + 2} = \frac{80}{10} = 8$$

Compute b:

$$b = y_1 - kx_1 = y_2 - kx_2$$

$$b = -87 - 8 * (-2) = -87 + 16 = -71$$

$$b = -7 - 8 * 8 = -7 - 64 = -71$$

Thus,

$$y = 8x - 71$$

Answer: $y = 8x - 71$.