Topic: Point-slope and slope-intercept forms of a line

Question: Find the equation of the line.

$$m = -\frac{2}{3}$$

$$(-7,2)$$

Answer choices:

A $y + 2 = \frac{2}{3}(x - 7)$

B $y - 2 = \frac{2}{3}(x + 7)$

C $y + 2 = -\frac{2}{3}(x - 7)$

D $y - 2 = -\frac{2}{3}(x + 7)$

Solution: D

When we're given a point and the slope, we can use the point-slope form of the equation of a line,

$$y - y_1 = m(x - x_1)$$

where m is the slope and (x_1, y_1) is a point on the line.

We'll first plug in the slope and the coordinates of the point we've been given, and then simplify the equation by solving for y.

$$y - 2 = -\frac{2}{3}(x - (-7))$$

$$y - 2 = -\frac{2}{3}(x + 7)$$

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Question: Find the equation, in point-slope form, of the line that passes through $(2,3)$ and $(4,11)$. Use $(2,3)$ for (x_1, y_1).

Answer choices:

A $y - 3 = 4(x - 2)$

B $y - 3 = 8(x - 2)$

C $y + 3 = 4(x + 2)$

D $y - 3 = 4(x + 2)$

Solution: A

First, find the slope of the line by plugging $(2,3)$ and $(4,11)$ into the slope formula.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{11 - 3}{4 - 2} = \frac{8}{2} = 4$$

Next, substitute $m = 4$ and the point $(2,3)$ into the point-slope formula for the equation of a line.

$$y - y_1 = m(x - x_1)$$

$$y - 3 = 4(x - 2)$$

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Question: Find the slope-intercept form of the line that passes through $(0, -2)$ and has a slope of $1/2$.

Answer choices:

A $y = \frac{1}{2}(x - 2)$

B $y = \frac{1}{2}x + 2$

C $y = \frac{1}{2}x - 2$

D $y = \frac{1}{2}x - 1$

Solution: C

First we'll plug $m = 1/2$ and $(x_1, y_1) = (0, -2)$ in the point-slope formula for the equation of a line.

$$y - y_1 = m(x - x_1)$$

$$y - (-2) = \frac{1}{2}(x - 0)$$

$$y + 2 = \frac{1}{2}x$$

Now we'll subtract 2 from both sides to convert the equation into slope-intercept form.

$$y = \frac{1}{2}x - 2$$