**Topic**: Equation of a line in point-slope form

**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, which is

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

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 $y$.

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

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

**Topic**: Equation of a line in point-slope form

**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 using the given points.

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

Next, substitute $m = 4$ and the coordinates of the point $(2,3)$ into the formula $y - y_1 = m(x - x_1)$.

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

**Topic**: Equation of a line in point-slope form

**Question**: Find the equation, in point-slope form, of the line that passes through $(-3,0)$ and rises $2$ in a run of $4$.

**Answer choices**:

A $y = \frac{1}{2}(x - 3)$

B $y = 2(x - 3)$

C $y + 3 = \frac{1}{2}x$

D $y = \frac{1}{2}(x + 3)$

**Solution**: D

First, find the slope of the line using the rise and run.

$$m = \frac{2}{4} = \frac{1}{2}$$

Next, use $y - y_1 = m(x - x_1)$. Use $(-3,0)$ as $(x_1, y_1)$, and get

$$y - 0 = \frac{1}{2}(x - (-3))$$

$$y = \frac{1}{2}(x + 3)$$