Topic: Equation of a line in slope-intercept form

Question: Find the equation, in 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, use $m = 1/2$ and $(x_1, y_1) = (0, -2)$ in the equation $y - y_1 = m(x - x_1)$.

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

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

Now subtract 2 from both sides to get this equation into slope-intercept form.

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

Topic: Equation of a line in slope-intercept form

Question: Find the equation, in slope-intercept form, of the line that passes through $(-3, -2)$ and $(3, -4)$.

Answer choices:

A $y = -3x - 3$

B $y = -\frac{1}{3}x - 3$

C $y = -3x - 1$

D $y = -\frac{1}{3}x - 1$

Solution: B

First, find the slope.

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

$$m = \frac{-4 - (-2)}{3 - (-3)} = \frac{-2}{6} = -\frac{1}{3}$$

Next, use the equation $y - y_1 = m(x - x_1)$. m will be $-1/3$. Using the point $(-3, -2)$ for (x_1, y_1), we get

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

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

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

Finally, subtract 2 from both sides to get this equation into slope-intercept form.

$$y = -\frac{1}{3}x - 3$$

Topic: Equation of a line in slope-intercept form

Question: Find the equation, in slope-intercept form, of the line that passes through $(2,5)$ and is parallel to $y = 3 - 2x$.

Answer choices:

A $y = -2x - 12$

B $y = 2x + 2$

C $y = 2x + 1$

D $y = -2x + 9$

Solution: D

First, rewrite the given equation in slope-intercept form.

$$y = -2x + 3$$

Remembering $y = mx + b$, we can see that the slope of the given equation is -2. For the two lines to be parallel, the equation we're looking for must also have a slope of -2.

Next, use the equation $y - y_1 = m(x - x_1)$. Use -2 for m and $(2,5)$ for (x_1, y_1).

$$y - 5 = -2(x - 2)$$

$$y - 5 = -2x + 4$$

Add 5 to both sides to put the equation in slope-intercept form.

$$y = -2x + 9$$