

**Topic:** Solving with substitution

**Question:** Use substitution to find the unique solution to the system of equations.

$$y = x + 7$$

$$x + 2y = -16$$

**Answer choices:**

A       $(10, 3)$

B       $(-10, 3)$

C       $(10, -3)$

D       $(-10, -3)$



**Solution: D**

Since the first equation is already solved for  $y$ , we'll make a substitution for  $y$  in the second equation, so that we can get the second equation in terms of only  $x$  and then solve for  $x$ .

$$x + 2y = -16$$

$$x + 2(x + 7) = -16$$

$$x + 2x + 14 = -16$$

$$3x + 14 = -16$$

$$3x + 14 - 14 = -16 - 14$$

$$3x = -30$$

$$\frac{3x}{3} = \frac{-30}{3}$$

$$x = -10$$

Now we'll take the value we found for  $x$  and plug it into the first equation to find the value of  $y$ .

$$y = x + 7$$

$$y = -10 + 7$$

$$y = -3$$



**Topic:** Solving with substitution

**Question:** Use substitution to find the unique solution to the system of equations.

$$y = x + 3$$

$$2x + y = 10$$

**Answer choices:**

A  $\left(-\frac{16}{3}, -\frac{7}{3}\right)$

B  $\left(-\frac{7}{3}, -\frac{16}{3}\right)$

C  $\left(\frac{16}{3}, \frac{7}{3}\right)$

D  $\left(\frac{7}{3}, \frac{16}{3}\right)$



**Solution: D**

Since the first equation is already solved for  $y$ , we'll make a substitution for  $y$  in the second equation, so that we can get the second equation in terms of only  $x$  and then solve for  $x$ .

$$2x + y = 10$$

$$2x + (x + 3) = 10$$

$$2x + x + 3 = 10$$

$$3x + 3 = 10$$

$$3x = 7$$

$$x = \frac{7}{3}$$

Now we'll take the value we found for  $x$  and plug it into the first equation to find the value of  $y$ .

$$y = x + 3$$

$$y = \frac{7}{3} + 3$$

$$y = \frac{7}{3} + 3 \left( \frac{3}{3} \right)$$

$$y = \frac{7}{3} + \frac{9}{3}$$

$$y = \frac{16}{3}$$



**Topic:** Solving with substitution

**Question:** Use substitution to find the unique solution to the system of equations.

$$3x - y = -5$$

$$y = -2x - 5$$

**Answer choices:**

A      $(2, 1)$

B      $(-2, 1)$

C      $(-2, -1)$

D      $(2, -1)$



**Solution: C**

Since the second equation is already solved for  $y$ , we'll make a substitution for  $y$  in the first equation, so that we can get the first equation in terms of only  $x$  and then solve for  $x$ .

$$3x - y = -5$$

$$3x - (-2x - 5) = -5$$

$$3x + 2x + 5 = -5$$

$$5x + 5 = -5$$

$$5x + 5 - 5 = -5 - 5$$

$$5x = -10$$

$$x = -2$$

Now we'll take the value we found for  $x$  and plug it into the second equation to find the value of  $y$ .

$$y = -2x - 5$$

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

$$y = 4 - 5$$

$$y = -1$$

