

**Topic:** Solving systems with Cramer's rule**Question:** Which expression would give the solution for  $y$  in this system?

$$3x - 2y = 21$$

$$-6x - 5y = 12$$

**Answer choices:**

$$\text{A} \quad \frac{\begin{vmatrix} 3 & -2 \\ -6 & -5 \end{vmatrix}}{\begin{vmatrix} 21 & -2 \\ 12 & -5 \end{vmatrix}}$$

$$\text{B} \quad \frac{\begin{vmatrix} 3 & 21 \\ -6 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & 6 \\ -2 & 1 \end{vmatrix}}$$

$$\text{C} \quad \frac{\begin{vmatrix} 21 & -2 \\ 12 & -5 \end{vmatrix}}{\begin{vmatrix} 3 & -2 \\ -6 & -5 \end{vmatrix}}$$

$$\text{D} \quad \frac{\begin{vmatrix} 3 & 21 \\ -6 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & -2 \\ -6 & -5 \end{vmatrix}}$$



**Solution: D**

Using the given system

$$3x - 2y = 21$$

$$-6x - 5y = 12$$

we can say

$$D = \begin{vmatrix} 3 & -2 \\ -6 & -5 \end{vmatrix}$$

and

$$D_y = \begin{vmatrix} 3 & 21 \\ -6 & 12 \end{vmatrix}$$

We can put those together to solve for the value of  $y$ .

$$y = \frac{D_y}{D} = \frac{\begin{vmatrix} 3 & 21 \\ -6 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & -2 \\ -6 & -5 \end{vmatrix}}$$



**Topic:** Solving systems with Cramer's rule

**Question:** Which expression below would give the solution for  $x$  in this system?

$$3x + 3y = 9$$

$$2x - y = -9$$

**Answer choices:**

A 
$$\frac{\begin{vmatrix} 3 & 9 \\ 2 & -9 \end{vmatrix}}{\begin{vmatrix} 3 & 3 \\ 2 & -1 \end{vmatrix}}$$

B 
$$\frac{\begin{vmatrix} 9 & 3 \\ -9 & -1 \end{vmatrix}}{\begin{vmatrix} 3 & 3 \\ 2 & -1 \end{vmatrix}}$$

C 
$$\frac{\begin{vmatrix} 3 & 3 \\ 2 & -1 \end{vmatrix}}{\begin{vmatrix} 9 & 3 \\ -9 & -1 \end{vmatrix}}$$

D 
$$\frac{\begin{vmatrix} 3 & 3 \\ 2 & -1 \end{vmatrix}}{\begin{vmatrix} 3 & 9 \\ 2 & -9 \end{vmatrix}}$$



**Solution: B**

Using the given system

$$3x + 3y = 9$$

$$2x - y = -9$$

we can say

$$D = \begin{vmatrix} 3 & 3 \\ 2 & -1 \end{vmatrix}$$

and

$$D_x = \begin{vmatrix} 9 & 3 \\ -9 & -1 \end{vmatrix}$$

We can put those together to solve for the value of  $x$ .

$$x = \frac{D_x}{D} = \frac{\begin{vmatrix} 9 & 3 \\ -9 & -1 \end{vmatrix}}{\begin{vmatrix} 3 & 3 \\ 2 & -1 \end{vmatrix}}$$



**Topic:** Solving systems with Cramer's rule**Question:** Which system below would give this value?

$$\frac{D_x}{D} = \frac{\begin{vmatrix} 1 & -5 \\ 15 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ 1 & 2 \end{vmatrix}}$$

**Answer choices:**

- A  $3x - 5y = 1$  and  $x + 2y = 15$
- B  $x - 5y = 3$  and  $15x - 2y = 1$
- C  $3x + y = -5$  and  $x - 15y = 2$
- D  $x - 2y = 1$  and  $3x + 15y = 2$



**Solution: A**

One way to start this is to figure out the  $D$  for each answer choice and see which one(s) match the given expression.

For answer choice A we get

$$D = \begin{vmatrix} 3 & -5 \\ 2 & -1 \end{vmatrix}$$

For answer choice B we get

$$D = \begin{vmatrix} 1 & -5 \\ 15 & -2 \end{vmatrix}$$

For answer choice C we get

$$D = \begin{vmatrix} 3 & 1 \\ 1 & -15 \end{vmatrix}$$

For answer choice D we get

$$D = \begin{vmatrix} 1 & -2 \\ 3 & 15 \end{vmatrix}$$

Only answer choice A matched the  $D$  in the given expression, so there's no need to check the  $D_x$  determinant.

