

Topic: Solving with elimination

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

$$x - 3y = -7$$

$$2x - 3y = 4$$

Answer choices:

A $(12, 7)$

B $(11, 6)$

C $(9, 3)$

D $(-11, -6)$



Solution: B

Since the y -term in each equation is $-3y$, we'll subtract the second equation from the first equation.

$$x - 3y - (2x - 3y) = -7 - (4)$$

$$x - 3y - 2x + 3y = -7 - 4$$

$$-x = -11$$

$$x = 11$$

Now that we have the value of x , we'll plug it into the original first equation and solve for y .

$$x - 3y = -7$$

$$11 - 3y = -7$$

$$11 - 11 - 3y = -7 - 11$$

$$-3y = -18$$

$$y = 6$$

To make sure that $(11,6)$ is the solution to the system, we'll plug it into the other original equation, the one we didn't use to find y .

$$2x - 3y = 4$$

$$2(11) - 3(6) = 4$$

$$22 - 18 = 4$$



$$4 = 4$$

Since $4 = 4$ is true, we know $(11,6)$ is the solution to the system.



Topic: Solving with elimination

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

$$x - 2y = -1$$

$$2x - 3y = 4$$

Answer choices:

- A $(11, 6)$
- B $(-11, -6)$
- C $(-11, 6)$
- D $(11, -6)$



Solution: A

We'll multiply both sides of the first equation by 2 so that the x -term in each equation will be $2x$.

$$x - 2y = -1$$

$$2(x - 2y) = 2(-1)$$

$$2x - 4y = -2$$

Now that the x -term in each equation is $2x$, we'll subtract the original second equation from the new first equation.

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

$$2x - 4y - 2x + 3y = -2 - 4$$

$$-y = -6$$

$$y = 6$$

Now that we have the value of y , we'll plug it into the original first equation and solve for x .

$$x - 2y = -1$$

$$x - 2(6) = -1$$

$$x - 12 = -1$$

$$x - 12 + 12 = -1 + 12$$

$$x = 11$$



To make sure that (11,6) is the solution to the system, we'll plug it into the other original equation, the one we didn't use to find x .

$$2x - 3y = 4$$

$$2(11) - 3(6) = 4$$

$$22 - 18 = 4$$

$$4 = 4$$

Since $4 = 4$ is true, we know (11,6) is the solution to the system.



Topic: Solving with elimination

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

$$3x - 4y = 7$$

$$2x - 7y = -4$$

Answer choices:

A $(-5, 2)$

B $(5, 2)$

C $(-5, -2)$

D $(5, -2)$



Solution: B

We'll multiply the first equation by 2 and the second equation by 3 so that both equations will contain a $6x$.

$$(3x - 4y = 7)2$$

$$(3x)2 - (4y)2 = (7)2$$

$$6x - 8y = 14$$

and

$$(2x - 7y = -4)3$$

$$(2x)3 - (7y)3 = (-4)3$$

$$6x - 21y = -12$$

Now that both equations include a $6x$, we should be able to subtract one from the other in order to eliminate it.

$$6x - 8y - (6x - 21y) = 14 - (-12)$$

$$6x - 8y - 6x + 21y = 14 + 12$$

$$13y = 26$$

$$y = 2$$

Now that we have a value for y , we can plug it back into one of the original equations to solve for the corresponding value of x .

$$3x - 4y = 7$$



$$3x - 4(2) = 7$$

$$3x - 8 = 7$$

$$3x - 8 + 8 = 7 + 8$$

$$3x = 15$$

$$x = 5$$

To make sure that (5,2) is the solution to the system, we'll plug it into the other original equation, the one we didn't use to find x .

$$2x - 7y = -4$$

$$2(5) - 7(2) = -4$$

$$10 - 14 = -4$$

$$-4 = -4$$

Since $-4 = -4$ is true, we know (5,2) is the solution to the system.

