Topic: Solving systems 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.

$$x - 3y = -7$$

$$11 - 3y = -7$$

$$-3y = -18$$

$$y = 6$$

Topic: Solving systems 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 through 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.

$$x - 2y = -1$$

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

$$x - 12 = -1$$

$$x = 11$$

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

Multiply through the first equation by 2 and the second equation by 3 so that both equations will contain a $6x$.

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

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

$$6x - 8y = 14$$

and

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

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

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

Then the new system is

$$6x - 8y = 14$$

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

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.

$$3x - 4y = 7$$

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

$$3x - 8 = 7$$

$$3x = 15$$

$$x = 5$$