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SOLVING LINEAR SYSTEMS USING ELIMINATION Exit Quiz

Find the solution of the following systems by ELIMINATION and determine if it is an independent, inconsistent or dependent system

1. $\begin{cases} x + y = 3 \\ 4x + 3y = 10 \end{cases}$

2. $\begin{cases} x - 2y = 1 \\ 5x + 3y = 8 \end{cases}$

3. $\begin{cases} 6x + 2y = 7 \\ y = 1 - 3x \end{cases}$

4. $\begin{cases} 5x - y = 4 \\ x - y = 3 \end{cases}$

5. $\begin{cases} x - y = 10 \\ x + 6y = 1 \end{cases}$

6. $\begin{cases} -2x + y = 1 \\ 3x - y = 4 \end{cases}$

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ANSWERS

Find the solution of the following systems by ELIMINATION and determine if it is an independent, inconsistent or dependent system

1.

I. x + y = 3 and II. 4x + 3y = 10

We interchange the "x" or "y" coefficients from equation I and equation II to eliminate one of the variables. In this case, we are going to interchange the "y" coefficients of both equations, like follows:

$$\begin{cases} 3(x+y=3) \\ -\ 1(4x+3y=10) \end{cases}$$

As both coefficients have equal signs, we have to assign a negative sign to one of the coefficients so they can eliminate each other.

Applying distributive property:

$$\begin{cases} 3x+3y=9 \\ -4x-3y=-10 \end{cases}$$

The result would be:

$$-x=-1 \qquad \rightarrow x=1$$

Now, we calculate the value of variable "y" by substituting the result of x into the equation y =3-x

$$y=3-1=2$$

Solution (1, 2). Independent System

2.

I. x - 2y = 1 and II. 5x + 3y = 8

We interchange the "x" or "y" coefficients from equation I and equation II to eliminate one of the variables. In this case, we are going to interchange the "y" coefficients of both equations, like follows:

$$\begin{cases} 3(x-2y=1) \\ 2(5x+3y=8) \end{cases}$$

As both coefficients have different signs, we do not have to assign a negative sign to one of the coefficients so they can eliminate each other.

Applying distributive property:

$$\begin{cases} 3x-6y=3 \\ 10x+6y=16 \end{cases}$$

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The result would be:

$$13x = 19 \qquad \rightarrow x = \frac{19}{13}$$

Now, we calculate the value of variable "y" by substituting the result of x into one of the equations:

$$y = \frac{x-1}{2} = \frac{\frac{19}{13}-1}{2} = \frac{3}{13}$$

Solution (19/13, 3/13). Independent System

3.

I. 6x + 2y = 7 and II. y = 1 – 3x

We interchange the "x" or "y" coefficients from equation I and equation II to eliminate one of the variables. In this case, we are going to interchange the "y" coefficients of both equations, like follows:

$$\begin{cases} 1(6x + 2y = 7) \\ -\ 2(3x + y = 1) \end{cases}$$

As both coefficients have equal signs, we have to assign a negative sign to one of the coefficients so they can eliminate each other.

Applying distributive property:

$$\begin{cases} 6x + 2y = 7 \\ -6x - 2y = -2 \end{cases}$$

The result would be:

$$0 = 5$$

No solution. Inconsistent System

4.

I. 5x - y = 4 and II. x – y = 3

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We interchange the "x" or "y" coefficients from equation I and equation II to eliminate one of the variables. In this case, we are going to interchange the "y" coefficients of both equations, like follows:

$$\begin{cases} 1(5x - y = 4) \\ -\ 1(x - y = 3) \end{cases}$$

As both coefficients have equal signs, we have to assign a negative sign to one of the coefficients so they can eliminate each other.

Applying distributive property:

$$\begin{cases} 5x - y = 4 \\ -x + y = -3 \end{cases}$$

The result would be:

$$4x = 1 \qquad \rightarrow x = \frac{1}{4}$$

Now, we calculate the value of variable "y" by substituting the result of x into one of the equations:

$$y = x - 3 \quad \rightarrow \quad y = \frac{1}{4} - 3 = -\frac{11}{4}$$

Solution (1/4, -11/4). Independent System

5.

I. x - y = 10 and II. x + 6y = 1

We interchange the "x" or "y" coefficients from equation I and equation II to eliminate one of the variables. In this case, we are going to interchange the "x" coefficients of both equations, like follows:

$$\begin{cases} 1(x - y = 10) \\ -\ 1(x + 6y = 1) \end{cases}$$

As both coefficients have equal signs, we have to assign a negative sign to one of the coefficients so they can eliminate each other.

Applying distributive property:

$$\begin{cases} x - y = 10 \\ -x - 6y = -1 \end{cases}$$

The result would be:

$$-7y = 9 \qquad \rightarrow y = -\frac{9}{7}$$

Now, we calculate the value of variable "x" by substituting the result of "y" into the equation x = 10 + y

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$$x = 10 - \frac{9}{7} = \frac{61}{7}$$

Solution (61/7, -9/7). Independent System

6.

I. - 2x + y = 1 and II. 3x - y = 4

We interchange the "x" or "y" coefficients from equation I and equation II to eliminate one of the variables. In this case, we are going to interchange the "y" coefficients of both equations, like follows:

$$\begin{cases} (-2x + y = 1) \\ (3x - y = 4) \end{cases}$$

As both coefficients have different signs, we do not have to assign a negative sign to one of the coefficients so they can eliminate each other.

The result would be:

$$x = 5$$

Now, we calculate the value of variable "y" by substituting the result of x into one of the equations:

$$y = 3x - 4 \quad \rightarrow \quad y = 3(5) - 4 = 11$$

Solution (5, 11). Independent System

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