System of Equations (No Solution)

1. Does the system of linear equations shown below have a solution? Explain.

$$\begin{cases} 2x + 5y = 9 \\ -4x - 10y = 4 \end{cases}$$

2. Does the system of linear equations shown below have a solution? Explain.

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

3. Does the system of linear equations shown below have a solution? Explain

$$\begin{cases} x + 7y = 8 \\ 7x - y = -2 \end{cases}$$

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1. Does the system of linear equations shown below have a solution? Explain.

$$\begin{cases} 2x + 5y = 9 \\ -4x - 10y = 4 \end{cases}$$

No, this system does not have a solution. The slope of the first equation is $-\frac{2}{5}$, and the slope of the second equation is $-\frac{4}{10}$, which is equivalent to $-\frac{2}{5}$. Since the slopes are the same, but the lines are distinct, these equations will graph as parallel lines. Parallel lines never intersect, which means this system has no solution.

2. Does the system of linear equations shown below have a solution? Explain.

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

Yes, this system does have a solution. The slope of the first equation is $\frac{3}{4}$, and the slope of the second equation is $\frac{4}{3}$. Since the slopes are different, these equations will graph as nonparallel lines, which means they will intersect at some point.

3. Does the system of linear equations shown below have a solution? Explain

$$\begin{cases} x + 7y = 8 \\ 7x - y = -2 \end{cases}$$

Yes, this system does have a solution. The slope of the first equation is $-\frac{1}{7}$, and the slope of the second equation is 7. Since the slopes are different, these equations will graph as nonparallel lines, which means they will intersect at some point.