

## System of Equations (No Solution)

1. Does each system of linear equations have a solution? Explain your answer.

$$\text{a) } \begin{cases} y = \frac{5}{4}x - 3 \\ y + 2 = \frac{5}{4}x \end{cases}$$

$$\text{b) } \begin{cases} y = \frac{2}{3}x - 5 \\ 4x - 8y = 11 \end{cases}$$

$$\text{c) } \begin{cases} \frac{1}{3}x + y = 8 \\ x + 3y = 12 \end{cases}$$

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$$\text{a) } \begin{cases} y = \frac{5}{4}x - 3 \\ y + 2 = \frac{5}{4}x \end{cases}$$

*No, this system does not have a solution. The slope of the first equation is  $\frac{5}{4}$ , and the slope of the second equation is  $\frac{5}{4}$ . Since the slopes are the same, and they are distinct lines, these equations will graph as parallel lines. Parallel lines never intersect; therefore, this system has no solution.*

$$\text{b) } \begin{cases} y = \frac{2}{3}x - 5 \\ 4x - 8y = 11 \end{cases}$$

*Yes, this system does have a solution. The slope of the first equation is  $\frac{2}{3}$ , and the slope of the second equation is  $\frac{1}{2}$ . Since the slopes are different, these equations will graph as nonparallel lines, which means they will intersect at some point.*

$$\text{c) } \begin{cases} \frac{1}{3}x + y = 8 \\ x + 3y = 12 \end{cases}$$

*No, this system does not have a solution. The slope of the first equation is  $-\frac{1}{3}$ , and the slope of the second equation is  $-\frac{1}{3}$ . Since the slopes are the same, and they are distinct lines, these equations will graph as parallel lines. Parallel lines never intersect; therefore, this system has no solution.*