

System of Equations (Elimination)

Each of the following systems has a solution. Determine the solution to the system by eliminating one of the variables.

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

2.
$$\begin{cases} y = 3x - 5 \\ y = -3x + 7 \end{cases}$$

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

$$-3(2x - 3y = -5)$$

$$-6x + 9y = 15$$

$$2(3x + 5y = 1)$$

$$6x + 10y = 2$$

$$\begin{cases} -6x + 9y = 15 \\ 6x + 10y = 2 \end{cases}$$

$$-6x + 9y + 6x + 10y = 15 + 2$$

$$19y = 17$$

$$y = \frac{17}{19}$$

$$2x - 3\left(\frac{17}{19}\right) = -5$$

$$2x - \frac{51}{19} = -5$$

$$2x = -5 + \frac{51}{19}$$

$$2x = -\frac{44}{19}$$

$$x = -\frac{44}{38}$$

$$x = -\frac{22}{19}$$

The solution is $\left(-\frac{22}{19}, \frac{17}{19}\right)$.

$$2. \begin{cases} y = 3x - 5 \\ y = -3x + 7 \end{cases}$$

$$3x - 5 = -3x + 7$$

$$6x = 12$$

$$x = 2$$

$$y = 3(2) - 5$$

$$y = 6 - 5$$

$$y = 1$$

The solution is (2,1).