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. $\begin{cases} 6x - 7y = -10 \\ 3x + 7y = -8 \end{cases}$

2. $\begin{cases} x - 4y = 7 \\ 5x + 9y = 6 \end{cases}$

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1. $\begin{cases} 6x - 7y = -10 \\ 3x + 7y = -8 \end{cases}$

$$6x - 7y + 3x + 7y = -10 + (-8)$$
$$9x = -18$$
$$x = -2$$

$$3(-2) + 7y = -8$$
$$-6 + 7y = -8$$
$$7y = -2$$
$$y = -\frac{2}{7}$$

The solution is $\left(-2, -\frac{2}{7}\right)$.

2. $\begin{cases} x - 4y = 7 \\ 5x + 9y = 6 \end{cases}$

$$-5(x - 4y = 7)$$
$$-5x + 20y = -35$$

$$\begin{cases} -5x + 20y = -35 \\ 5x + 9y = 6 \end{cases}$$
$$-5x + 20y + 5x + 9y = -35 + 6$$
$$29y = -29$$
$$y = -1$$

$$x - 4(-1) = 7$$
$$x + 4 = 7$$
$$x = 3$$

The solution is $(3, -1)$.

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