Example

Solve the following system by any method if possible

$$2x + y = -9$$
$$3x + 2y = -13$$
$$-x + 6y = 11$$

The best way is by substitution. In the last equation, we can solve for $x \Rightarrow -x = 11 - 6y$

$$\Rightarrow x = -(11 - 6y)$$
$$x = 6y - 11 \,*$$

Take this expression of x and put it in the 1st equation and the second to solve for y.

In 1st eqn: $2(6y - 11) + y = -9 \Rightarrow 12y - 22 + y = -9$

$$13y = 22 - 9$$
$$13y = 13$$
$$y = 1$$

In 2nd eqn: $3(6y - 11) + 2y = -13 \Rightarrow 18y - 33 + 2y = -13$

$$20y = -13 + 33$$
$$20y = 20$$
$$y = 1$$

We got the same value for y from Eqn 1 and Eqn 2

From $*$ $x = 6y - 11 = 6(1) - 11 = -5$

$x = -5, y = 1$ Or the system is consistent with an intersection point $(-5, 1)$

Example Solve the following system if possible

$$3x + 2y = 5$$
$$-x + 5y = 2$$
$$2x + 7y = 3$$