

October 4th, 2001

Solving by Substitution

$$3x + 4y = 7$$

$$3y = 4x - 1$$

Step 1: Solve one equation for a variable.

$$\frac{3y}{3} = \frac{4x}{3} - \frac{1}{3}$$

$$y = \frac{4}{3}x - \frac{1}{3}$$

Step 2: Sub this into the OTHER equation.

$$3x + 4y = 7$$

$$3x + 4\left(\frac{4}{3}x - \frac{1}{3}\right) = 7$$

Step 3: Solve for variable

$$3x + \frac{16}{3}x - \frac{4}{3} = 7$$

$$\frac{25}{3}x = \frac{25}{3}$$

$$x = 1$$

Step 4: Sub letter back into the ORIGINAL equation

sub $x = 1$ into $3y = 4x - 1$

$$3y = 4(1) - 1$$

$$3y = 4 - 1$$

$$\frac{3y}{3} = \frac{3}{3}$$

$$y = 1$$

$\therefore (1, 1)$

Short Cuts

Ex 1: $4x + 3y = 7$
 $3y = 2x + 1$

Step 1: Solve for "3y"

Step 2: Sub into other equation

$$\begin{aligned}4x + 3y &= 7 \\4x + (2x + 1) &= 7\end{aligned}$$

Step 3: Solve

$$\begin{aligned}4x + 2x + 1 &= 7 \\6x &= 6 \\x &= 1\end{aligned}$$

Step 4: Sub $x=1$ into $3y = 2x + 1$

$$\begin{aligned}3y &= 2(1) + 1 \\3y &= 3 \\y &= 1\end{aligned} \quad \therefore (1, 1)$$

Ex 2: $y = 3x - 4$
 $y = 2x - 2$

$$\begin{aligned}y &= 3(2) - 4 \\y &= 6 - 4 \\y &= 2\end{aligned}$$

$$\begin{aligned}3x - 4 &= 2x - 2 \\3x - 2x &= 4 - 2 \\x &= 2\end{aligned}$$

$$\therefore (2, 2)$$