

## Steps for Substitution

Step 1: Solve for 1 variable.Step 2: Plug into other equation. Solve.Step 3: Plug in your answer. Solve.Step 4: Write the solution as an (x,y)

Ex. 1: Solve the linear system:

$$y = 3x + 2$$

$$x + 2y = 11$$

$$\begin{aligned} y &= 3(1) + 2 \\ &= 3 + 2 \\ y &= 5 \end{aligned}$$

$$\begin{aligned} x + 2(3x + 2) &= 11 \\ x + 6x + 4 &= 11 \\ 7x + 4 &= 11 \\ \underline{-4} \quad \underline{-4} & \\ 7x &= 7 \\ \frac{7x}{7} &= \frac{7}{7} \\ x &= 1 \end{aligned}$$

Solution: (1, 5)

Check your Solution:

Ex. 2: Solve the linear system:

$$x - 2y = -6$$

$$\begin{array}{r} +2y \quad +2y \\ \hline \end{array}$$

$$x = 2y - 6$$

$$x = 2(2) - 6$$

$$= 4 - 6$$

$$x = -2$$

$$4x + 6y = 4$$

$$4(2y - 6) + 6y = 4$$

$$8y - 24 + 6y = 4$$

$$14y - 24 = 4$$

$$\begin{array}{r} +24 \quad +24 \\ \hline 14y = 28 \\ \frac{14y}{14} = \frac{28}{14} \end{array}$$

$$y = 2$$

Solution: (-2, 2)

Check your Solution:

Ex. 3: Solve the linear system:

$$\begin{aligned}
 x - y &= 3 \\
 +y &+y \\
 \hline
 x &= y + 3 \\
 x &= -3 + 3 \\
 x &= 0
 \end{aligned}$$

$$\begin{aligned}
 x + 2y &= -6 \\
 y + 3 + 2y &= -6 \\
 3y + 3 &= -6 \\
 \underline{-3} &\quad \underline{-3} \\
 3y &= -9 \\
 \underline{\frac{3y}{3}} &= \underline{\frac{-9}{3}} \\
 y &= -3
 \end{aligned}$$

Solution: (0, -3)

Check your Solution:

Ex. 4: Many businesses pay website hosting companies to store and maintain the computer files that make up their websites. Internet service providers also offer website hosting. The costs for website hosting offered by a website hosting company and an Internet service provider are shown in the table. Find the number of **months** after which the total cost for website hosting will be the **same** for both companies.

Company	Set-up fee (dollars)	Cost per month (dollars)
Internet service provider	10	21.95
Website hosting company	None	22.45

Step 1: Write two equations below.

ISP Equation 1:  $y = 21.95x + 10$       Host Equation 2:  $y = 22.45x$

Step 2: Solve by substitution.

$$\begin{aligned}
 21.95x + 10 &= 22.45x \\
 -21.95x &\quad -21.95x \\
 \hline
 10 &= .5x \\
 \frac{10}{.5} &= \frac{.5x}{.5} \quad x = 20
 \end{aligned}$$

Months: 20

Homework: