

# 6-2 Substitution

Algebra I  
2-24-14

substitution:

Step 1: Get one variable alone

Step 2: substitute that expression into the other equation

Step 3: Solve for one variable

Step 4: Solve for other variable

Step 5: Verify w/other equation

Solve the system by substitution

①  $x=5$  (x, y)  
 $y = 2x + 2$        $y = 2(5) + 2$       Answer: (5, 12)  
 $y = 12$

②  $y = 2x$        $3x + 4(2x) = 11$        $y = 2(1)$   
 $3x + 4y = 11$        $3x + 8x = 11$        $y = 2$   
 $\frac{11x}{11} = \frac{11}{11}$       Answer: (1, 2)

verify w/other equation:  $x = 1$

$$3(1) + 4(2) = 11$$
$$3 + 8 = 11$$
$$11 = 11 \checkmark$$

③  $y = -4x + 12$       <sup>step 2+3</sup>  $2x + (-4x + 12) = 2$       <sup>step 4</sup>  $y = -4(5) + 12$   
 $2x + y = 2$        $2x - 4x + 12 = 2$        $y = -8$   
 $-2x + 12 = 2$   
 $-12 \quad -12$       (5, -8)  
<sup>step 5</sup> verify:  $2(5) + (-8) = 2$   
 $10 - 8 = 2$   
 $2 = 2 \checkmark$        $\frac{-2x}{-2} = \frac{-10}{-2}$   
 $x = 5$

$$\textcircled{4} \quad \begin{array}{l} y = x - 1 \\ x + y = 3 \end{array} \quad \begin{array}{l} x + (x - 1) = 3 \\ 2x - 1 = 3 \\ \quad +1 \quad +1 \end{array} \quad \begin{array}{l} y = 2 - 1 \\ y = 1 \end{array}$$

$$\frac{2x}{2} = \frac{4}{2}$$

$$\boxed{(2, 1)}$$

Verify:

$$\begin{array}{l} 2 + 1 = 3 \\ 3 = 3 \checkmark \end{array}$$

$$x = 2$$

$$\textcircled{5} \quad \begin{array}{l} x = y - 7 \\ x + 8y = 2 \end{array}$$

$$\begin{array}{l} (y - 7) + 8y = 2 \\ 9y - 7 = 2 \\ \quad +7 \quad +7 \end{array}$$

$$\begin{array}{l} x = 1 - 7 \\ x = -6 \end{array}$$

$$\frac{9y}{9} = \frac{9}{9}$$

$$\boxed{(-6, 1)}$$

Verify:

$$\begin{array}{l} -6 + 8(1) = 2 \\ -6 + 8 = 2 \\ 2 = 2 \checkmark \end{array}$$

$$y = 1$$

$\textcircled{6}$  Plant is 35cm tall. Grows 5cm/wk.  
A different plant is 41cm tall, Grows 3cm/wk.  
At what week will they be the same height?

$x = \text{weeks}$      $y = \text{cm}$

$$y = 35 + 5x$$

$$y = 41 + 3x$$

$$\begin{array}{r} 35 + 5x = 41 + 3x \\ -3x \quad -3x \end{array}$$

$$\begin{array}{r} 35 + 2x = 41 \\ -35 \quad -35 \end{array}$$

$$\frac{2x}{2} = \frac{6}{2}$$

$$x = 3$$

$$y = 35 + 5(3)$$

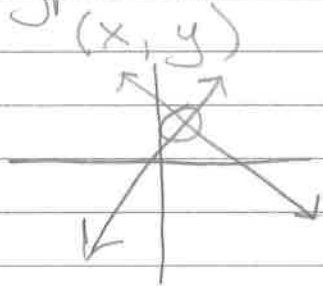
$$y = 35 + 15$$

$$y = 50$$

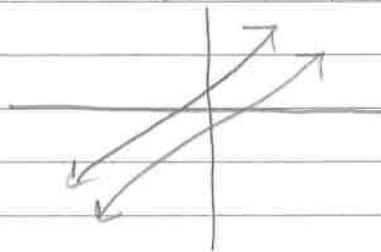
In 3 weeks they'll both be 50 cm.

⑦  $x + 2y = 13 \rightarrow$  solve for  $x$       $x + 2y = 13$   
 $-2x - 3y = -18$       $-2y - 2y$   
 $x = -2y + 13$

Types of Solutions:



no solution:  
 $2 = 5$  False



Variables cancel  
 $-6 = -6$  true



all real #'s

Hw: p 347 # 8-22 all, 24

Find two caterers

both  $\begin{cases} \text{- charge per person} \\ \text{- charge flat fee} \end{cases}$

