

Name: _____

CW: 7.1.6: Solving Linear Systems using Substitution

1. In a game of cards, Mrs. Bross scored 3 times as many points as Blake. If the total number of points scored by both players is 56, how many points did each player score?

a. Define your variables.

$x = \begin{matrix} \text{\# of points} \\ \text{Mrs. Bross} \end{matrix}$ $y = \begin{matrix} \text{\# of points} \\ \text{Blake} \end{matrix}$

b. Write a linear system to model this situation.

$$\begin{aligned} x + y &= 56 \\ \textcircled{1} \quad x &= 3y \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad x + y &= 56 \\ 3y + y &= 56 \\ 4y &= 56 \\ y &= 14 \end{aligned}$$

c. Solve the linear system. Using words, explain your solution in the context of the situation.

$\textcircled{3} \quad x = 3(14)$
 $x = 42$
 $(42, 14)$ Ms. Bross had 42 points.
Blake had 14 points.

4 steps to solving a linear system using SUBSTITUTION:

STEP 1: Solve one of the equations for one of its variables.

STEP 2: Substitute the expression from Step 1 into the other equation and solve for the other variable.

STEP 3: Substitute the value from Step 2 into one of the original equations and solve for the remaining variable.

STEP 4: Check your solutions in each of the original equations.

Solve the following systems using substitution:

2. $x + 2y = 19$

① $x = y + 10 \rightarrow$ ③ $x = 3 + 10$

② $x + 2y = 19$
 $y + 10 + 2y = 19$
 $3y + 10 = 19$
 $-10 -10$
 $3y = 9$
 $y = 3$
 $x = 13$
 $(13, 3)$

3. ① $y = x + 1$
 $2x + y = -2$

② $2x + x + 1 = -2$
 $3x + 1 = -2$
 $-1 -1$
 $3x = -3$
 $x = -1$

③ $y = -1 + 1$
 $y = 0$
 $(-1, 0)$

4. $y = x + 6$
 $x + y = 16$

5. $x = 3y$
 $x - 2y = -25$

6. ① $y = -2x + 10$
 $8x - y = 30$

② $8x - (-2x + 10) = 30$
 $8x + 2x - 10 = 30$
 $10x - 10 = 30$
 $+10 +10$
 $10x = 40$
 $x = 4$
 $y = 2$
 $(4, 2)$

7. ① $y = 4x + 2$
 $-4x + y = 10$

② $-4x + 4x + 2 = 10$
 $2 \neq 10$

No solution