

## Notes 6.4 – Solving Systems

## Post quiz practice

a. Solve using Substitution

$$\begin{cases} x = y - 11 \\ x - 3y = 1 \end{cases} \quad (-17, -6)$$

$$y - 11 - 3y = 1$$

$$-2y - 11 = 1$$

$$+11 +11$$

$$\frac{-2y}{-2} = \frac{12}{-2}$$

$$y = -6$$

$$x = -6 - 11$$

$$x = -17$$

List the steps to solve

1. Solve for one variable
2. Substitute into other equation
3. Solve
4. Substitute value into original equation
5. Solve
6. Write solution as ordered pair.

b. Solve using Elimination

$$\begin{cases} 3x + 2y = -5 \\ x - y = 10 \end{cases}$$

$$3 \left( \begin{array}{l} 3x - 3y = 30 \\ 3x + 2y = -5 \end{array} \right)$$

$$\frac{-5y}{-5} = \frac{35}{-5}$$

$$y = -7$$

$$x - (-7) = 10$$

$$x + 7 = 10$$

$$-7 -7$$

$$x = 3$$

$$(3, -7)$$

List the steps to solve

1. Line up variables
2. Multiply to make coefficients equal
3. Subtract & solve
4. Substitute value into original equation
5. Solve
6. Write solution as ordered pair.

# Lesson – Writing Equations and Solving from Context

## Two Sets of the Same Information

1. Madison's school is selling tickets to a spring musical. On the first day of ticket sales, the school sold 3 senior citizen tickets and 9 children's tickets for a total of \$75. On the second day, the school sold \$67 worth of tickets by selling 8 senior citizen tickets and 5 children's tickets. What is the price of one senior citizen ticket and one child ticket?

define variables

S = price of senior citizen ticket

C = price of child's ticket

write equations

day 1:  $3s + 9c = 75$

day 2:  $8s + 5c = 67$

$$\begin{array}{r} 3s + 9c = 75 \\ -9c \quad -9c \\ \hline \end{array}$$

$$\frac{3s}{3} = \frac{-9c + 75}{3}$$

$$s = -3c + 25$$

$$8(-3c + 25) + 5c = 67$$

$$-24c + 200 + 5c = 67$$

$$\begin{array}{r} -19c + 200 = 67 \\ -200 \quad -200 \\ \hline \end{array}$$

$$\begin{array}{r} -19c = -133 \\ \frac{-19c}{-19} = \frac{-133}{-19} \\ \hline \end{array}$$

$$c = 7$$

$$3s + 9(7) = 75$$

$$3s + 63 = 75$$

$$\begin{array}{r} 3s + 63 = 75 \\ -63 \quad -63 \\ \hline \end{array}$$

$$\frac{3s}{3} = \frac{12}{3}$$

$$s = 4$$

child ticket
\$7
senior ticket
\$4

## Two Kinds of Information

2. Javier bought some tickets to see his favorite band. He bought some adult tickets and some children's tickets, for a total of 9 tickets. The adult tickets cost \$10 per ticket, and the children's tickets cost \$8 per ticket. If he spent \$76, how many of each kind of ticket did he buy?

define variables

a = # of adult tickets

c = # of children's tickets

write equations

amount:  $a + c = 9$

costs:  $10a + 8c = 76$

$$10[a + c = 9]$$

$$\begin{array}{r} 10a + 10c = 90 \\ - [10a + 8c = 76] \\ \hline \end{array}$$

$$\frac{2c}{2} = \frac{14}{2}$$

$$c = 7$$

$$\begin{array}{r} a + 7 = 9 \\ -7 \quad -7 \\ \hline \end{array}$$

$$a = 2$$

2 adult tickets
7 children's tickets



## 2 kinds of info

3. Hailey puts all of her pennies and nickels in her piggy bank. She had saved a total of 474 coins. When she put her coins into the CoinStar machine, she had a total of \$11.22. How many pennies and how many nickels did she have?

define variables

$p = \#$  of pennies

$n = \#$  of nickels

write equations

amount :  $p + n = 474$

value :  $.01p + .05n = 11.22$

penny = \$.01

nickel = \$.05

$$\begin{array}{r} p + n = 474 \\ -n \quad -n \\ \hline \end{array}$$

$$p = 474 - n$$

$$.01(474 - n) + .05n = 11.22$$

$$4.74 - .01n + .05n = 11.22$$

$$\begin{array}{r} 4.74 + .04n = 11.22 \\ -4.74 \quad \quad \quad -4.74 \\ \hline \end{array}$$

$$\begin{array}{r} .04n = 6.48 \\ \underline{.04} \quad \quad \underline{.04} \end{array}$$

$$n = 162$$

$$\begin{array}{r} p + 162 = 474 \\ -162 \quad -162 \\ \hline \end{array}$$

$$p = 312$$

312 pennies  
162 nickels