

UNIT 5 DAY 16 NOTES

SYSTEMS OF LINEAR EQUATIONS - APPLICATION PROBLEMS

PARTNER THINK TANK: Can you and your partner come up with two equations to represent this scenario?
BONUS... can you solve it?!

Two plants, a tulip and a daisy, are planted to see how much they grow for a Biology experiment. The tulip is 5 cm tall and growing at a rate of 7 cm/day. The daisy is 8cm tall and growing at a rate of 1cm/day. When will the plants be the same height?!

Tulip Equation: $y = 7x + 5$

Daisy Equation: $y = 1x + 8$

Solution: Same height... set equal to each other by substitution
 $7x + 5 = 1x + 8$
 $6x = 3$
 $x = 2$ After 2 days

Helpful Steps when Solving Application Problems with System of Equations

- Step 1: identify the variables
- Step 2: write two equations
- Step 3: Solve for system using substitution OR Elimination
- Step 4: write final answer using correct units & Check ☺

LET'S GIVE IT A TRY!

EXAMPLE 1: You won a dinner with Carson Daly and the four judges on the Voice (How many total people are at dinner then??). Some of you order chicken for \$9 and some order steak for \$15. The total is \$78. How many chicken dinners were ordered?

$x = \# \text{ order chicken}$
 $y = \# \text{ order steak}$

$\# \text{ of ppl} : x + y = 6 \Rightarrow y = 6 - x$ Solve

costs: $9x + 15y = 78$ $9x + 15(6 - x) = 78$
 $9x + 90 - 15x = 78$

$-6x = -12$
 $x = 2 \Rightarrow y = 6 - 2$
 $y = 4$

Answer: 2 ppl ordered chicken
 4 ppl ordered steak



EXAMPLE 2: You sold two different types of cookie dough for your choral fundraiser. Sugar cookie dough sold for \$6 a package and deluxe triple chocolate chunk sold for \$8 a package. You collected a total of \$92 for the 14 packages. How many of each type of cookie dough did you sell?

$x = \# \text{ of sugar cookie}$
 $y = \# \text{ of choc. chunk}$

$$x + y = 14 \Rightarrow y = 14 - x$$

$$6x + 8y = 92 \Rightarrow 6x + 8(14 - x) = 92$$

$$6x + 112 - 8x = 92$$

$$-2x = -20$$

$$x = 10$$

$$y = 14 - 10$$

$$y = 4$$

Answer: 10 sugar cookie packages sold & 4 choc. chunk packages sold



EXAMPLE 3: There are 17 animals in Walker's Barn. Some are chickens and some are pigs. There are 54 legs in all. How many of each animal is there?

$x = \text{chickens}$ # of legs: $2x + 4y = 54 \Rightarrow 2x + 4y = 54$
 $y = \text{pigs}$ # of animals: $(x + y = 17) \Rightarrow \begin{matrix} + \\ -2x - 2y = -34 \end{matrix}$

$$2y = 20$$

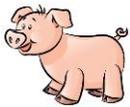
$$y = 10$$

$$x + 10 = 17$$

$$x = 7$$

Answer: 7 chickens &

10 pigs... oink!



EXAMPLE 4: A class of 100 students went on a field trip. They took 16 vehicles, some cars and some buses. Find out how many of each they took if each car holds 5 students and each bus holds 25 students.

$x = \# \text{ of cars}$ vehicles: $(x + y = 16) \Rightarrow -5x - 5y = 80$
 $y = \# \text{ of Buses}$ sts: $5x + 25y = 100 \Rightarrow \begin{matrix} + \\ 5x + 25y = 100 \end{matrix}$

$$20y = 180$$

$$y = 9$$

$$x + 9 = 16$$

$$x = 7$$

Answer:
7 cars
&
9 buses

EXAMPLE 5: L.A. Fitness is offering two kinds of dance classes - a Hip-Hop and a Tap class. There are currently 6 people attending the Hip-Hop class, and attendance is increasing at 4 people per month. There are currently 10 people attending the Tap class, and attendance is increasing at 2 people per month. When will the two classes have the same amount of people in them? How many people?

$x = \# \text{ of months}$ H-H: $y = 4x + 6$ *set = to each other!
 $y = \# \text{ of people}$ Tap: $y = 2x + 10$

$$4x + 6 = 2x + 10$$

$$2x = 4$$

$$x = 2$$

$y = 2(2) + 10$

$y = 4 + 10$

$y = 14$

Same amount at 2 months!
14 people attended!