

# Using Systems of Equations, Lesson 1

Ex ①

$d$ : # of dimes  
 $q$ : # of quarters

$$\begin{aligned} -10(d + q) &= (14) \cdot -10 \quad \leftarrow (\text{total \#}) \\ 10d + 25q &= 260 \quad \leftarrow (\text{total value}) \\ \hline -10d + -10q &= -140 \end{aligned}$$

$$\begin{aligned} d + q &= 14 \\ d + q &= 14 \\ d &= 6 \end{aligned}$$

$$\frac{15q}{15} = \frac{120}{15} = \frac{40}{5}$$

$$q = 8$$

**6 dimes; 8 quarters**

②

$n$ : # of nickels  
 $d$ : # of dimes

$$\begin{aligned} -10(n + d) &= (36) \cdot -10 \\ 5n + 10d &= 240 \\ \hline -10n + -10d &= -360 \end{aligned}$$

$$\begin{aligned} -5n &= -120 \\ n &= 24 \end{aligned}$$

$$\begin{aligned} 24 + d &= 36 \\ d &= 12 \end{aligned}$$

**12 dimes; 24 nickels**

③

$k$ : # of kids  
 $a$ : # of adults

$$\begin{aligned} a + 107 &= 125 \\ a &= 18 \end{aligned}$$

$$\begin{aligned} a + k &= 125 \quad a = (125 - k) \\ 5a + 3k &= 411 \\ 5(125 - k) + 3k &= 411 \\ 625 - 5k + 3k &= 411 \\ -2k &= -214 \\ k &= 107 \end{aligned}$$

**18 adults; 107 kids**

④

$M$ : # of slices in a Med.  
 $L$ : # of slices in a Large

$$\begin{aligned} -3(7L + 2M) &= (100) \\ 5L + 6M &= 108 \\ \hline -21L + -6M &= -300 \end{aligned}$$

$$\begin{aligned} 7(12) + 2M &= 100 \\ 84 + 2M &= 100 \\ 2M &= 16 \\ M &= 8 \end{aligned}$$

$$\begin{aligned} -16L &= -192 \\ L &= 12 \end{aligned}$$

**12 slices in a large  
 8 slices in a medium**

20  
28

Define your variables. Write two equations from the given information. Solve the system and state your solution, including units.

**Examples:**

- 1) Joe has 14 coins, all dimes and quarters, worth \$2.60. How many dimes and quarters does Joe have?
- 2) Bekah has 36 coins, all nickels and dimes, worth \$2.40. How many of each type of coin does she have?
- 3) 125 students and adult chaperones attend the museum. Adult tickets are \$5.00, student tickets are \$3.00. The total bill for the museum was \$411. How many adults and how many students attended?
- 4) The Sluggers go out for pizza after a game, seven large pizzas plus two medium pizzas have 100 slices. Five large plus six medium pizzas have 108 slices. How many are in each size?

**Practice:**

- 1) Kaymon has 24 coins, all dimes and quarters. The value is \$3.75. How many dimes and how many quarters does Kaymon have?
- 2) Three lemon cremes plus two fudge cookies have 400 calories. Two lemon cremes plus three fudge cookies have 425 calories. How many calories are in each kind?
- 3) The price of a sweater is \$5 less than twice the price of a shirt. If four shirts and three sweaters cost \$275, find the price of each item.
- 4) A group of students goes out to lunch. If two have tacos and five have burritos, the bill will be \$21.00. If four have burritos and three have tacos, the bill will be \$19.25. Find the price of each taco and burrito.
- 5) The cost of admission to the Spring Carnival was \$50 for a group of 9 children and 2 adults. The admission was \$61 for another group of 10 children and 3 adults. What was the admission price for each child? What was the admission price for each adult?
- 6) A group of students take their math teacher out for lunch. If five have hamburgers and three have hotdogs, the bill will be \$24.25. If three have hamburgers and five have hotdogs, the bill will be \$21.75. What is the price of a hamburger? What is the price of a hotdog?
- 7) Graham has 27 coins all nickels and quarters, worth \$4.35. How many of each type of coin does Graham have?
- 8) The cost of admission to the aquarium \$39 for a group of 8 children and 3 adults. The admission was \$43 for another group of 11 children and 2 adults. What was the price of admission for an adult? What was the price of admission for a child?
- 9) At Pizza Pi, the total price for 5 large pizzas plus two medium pizzas is \$81.50. The total for 4 large pizzas plus 3 medium pizzas is \$78.50. What is the price for each size of pizza?
- 10) Bryson's age plus twice Tanner's age is 30. The sum of three times Bryson's age and 8 times Tanner's age is 108. How old are Bryson and Tanner?
- 11) Hope has 30 coins, all quarters and dimes, in her piggy bank. If the value of the coins is \$4.80, how many of each type of coin does she have?
- 12) Chris scored 5 points less than twice the number of points scored by Hunter. Together they scored a total of 43 points. How many points were scored by each player?

Define your variables. Write two equations from the given information. Solve the system and state your solution, including units.

Examples:

Joe has 14 coins, all dimes and quarters, worth \$2.60. How many dimes and quarters does Joe have?

Bekah has 36 coins, all nickels and dimes, worth \$2.40. How many of each type of coin does she have?

125 students and adult chaperones attend the museum. Adult tickets are \$5.00, student tickets are \$3.00. The total for the museum was \$411. How many adults and how many students attended?

The Sluggers go out for pizza after a game, seven large pizzas plus two medium pizzas have 100 slices. Five large plus six medium pizzas have 108 slices. How many are in each size?

Practice:

Kaymon has 24 coins, all dimes and quarters. The value is \$3.75. How many dimes and how many quarters does Kaymon have?

15 dimes 9 quarters

Three lemon cremes plus two fudge cookies have 400 calories. Two lemon cremes plus three fudge cookies have 425 calories. How many calories are in each kind?

95 cal. in Fudge  
70 cal in lemon

The price of a sweater is \$5 less than twice the price of a shirt. If four shirts and three sweaters cost \$275, find the price of each item.

Sweater: \$53 shirt \$29

A group of students goes out to lunch. If two have tacos and five have burritos, the bill will be \$21.00. If four have burritos and three have tacos, the bill will be \$19.25. Find the price of each taco and burrito.

Burrito: \$3.50 Taco \$1.75

The cost of admission to the Spring Carnival was \$50 for a group of 9 children and 2 adults. The admission was \$61 for another group of 10 children and 3 adults. What was the admission price for each child? What was the admission price for each adult?

child: \$4 adult \$7

A group of students take their math teacher out for lunch. If five have hamburgers and three have hotdogs, the bill will be \$24.25. If three have hamburgers and five have hotdogs, the bill will be \$21.75. What is the price of a hamburger? What is the price of a hotdog?

hamburger: \$3.50 hotdog: \$2.25

Graham has 27 coins all nickels and quarters, worth \$4.35. How many of each type of coin does Graham have?

15 Quarters 12 nickels

The cost of admission to the aquarium \$39 for a group of 8 children and 3 adults. The admission was \$43 for another group of 11 children and 2 adults. What was the price of admission for an adult? What was the price of admission for a child?

Adults \$5 children \$3

At Pizza Pi, the total price for 5 large pizzas plus two medium pizzas is \$81.50. The total for 4 large pizzas plus 3 medium pizzas is \$78.50. What is the price for each size of pizza?

Med. \$9.50 Large \$12.50

Bryson's age plus twice Tanner's age is 30. Three times Bryson's age plus 8 times Tanner's age is 108. How old are Bryson and Tanner?

Bryson 12 years Tanner 9 years

Hope has 30 coins, all quarters and dimes, in her piggy bank. If the value of the coins is \$4.80, how many of each type of coin does she have?

18 dimes 12 quarters

Chris scored 5 points less than twice the number of points scored by Hunter. Together they scored a total of 43 points. How many points were scored by each player?

Chris: 27 points  
Hunter: 16 points