

8 Algebra RH

Essential Question: How do we solve word problems involving money?

Do Now:

Find the value of or write an expression for each.

- a. Number of cents in 7 nickels $7 \cdot 5¢ = 35¢$
- b. Number of cents in 5 quarters, 3 dimes and 13 pennies $5(25¢) + 3(10¢) + 13¢ = \1.68
- c. Number of cents in x nickels $5¢ \cdot x = 5x¢$
- d. Number of cents in x nickels and $15 - x$ dimes $5x + 10(15 - x)$

Coin Word Problems

Key Idea:

$$\begin{array}{c} \text{Value of} \\ \text{all coins} \end{array} = \underbrace{\begin{array}{c} \text{Total} \\ \text{Value of} \\ \text{Coin 1} \end{array}} + \begin{array}{c} \text{Total} \\ \text{Value of} \\ \text{Coin 2} \end{array}$$

$\underbrace{\hspace{10em}}_{\text{Value of one coin} \times \text{Qty}}$

Examples:

1. Mr. Jones has nickels, dimes and quarters worth \$3.20 in his piggy bank. There are three times as many quarters as nickels and 5 more dimes than nickels. How many coins of each kind are there?

	Value	\times Qty	Total Value
3 nickels	5	x	$5x$
8 dimes	10	$x+5$	$10(x+5)$
9 quarters	25	$3x$	$75x$

$$5x + 10(x+5) + 75x = 320$$

$$5x + 10x + 50 + 75x = 320$$

$$90x + 50 = 320$$

$$90x = 270$$

$$x = 3$$

2. A person has 23 coins made up of dimes and quarters worth \$3.35. How many coins of each type are there?

	Value	Qty	Tot Val
16 dimes	10	x	$10x$
7 quarters	25	$23-x$	$25(23-x)$

$$10x + 25(23-x) = 335$$

$$10x + 575 - 25x = 335$$

$$575 - 15x = 335$$

$$-15x = -240$$

$$x = 16$$

3. Zack put \$4.50 in dimes, nickels and quarters in his piggy bank. He had 5 more dimes than nickels and 16 less quarters than nickels. How many coins of each type are there?

	VAL	QTY	TOT VAL
25 dimes	10	$x+5$	$10(x+5)$
20 nickels	5	x	$5x$
4 quarters	25	$x-16$	$25(x-16)$

$$10(x+5) + 5x + 25(x-16) = 450$$

$$10x + 50 + 5x + 25x - 400 = 450$$

$$40x - 350 = 450$$

$$40x = 800$$

$$x = 20$$

4. John has 10 coins made up of dimes and quarters worth a total of \$1.45. How many coins of each type does he have?

	VAL	QTY	TOT VAL
7 dimes	10	x	$10x$
3 quarters	25	$10-x$	$25(10-x)$

$$10x + 25(10-x) = 145$$

$$10x + 250 - 25x = 145$$

$$250 - 15x = 145$$

$$-15x = -105$$

$$x = 7$$

5. Debbie has \$2.67 worth of quarters, dimes, nickels and pennies in her pocket. She has twice as many pennies as quarters, 3 more dimes than quarters, and half as many nickels as quarters. How many coins of each type are there?

	VAL	QTY	TOT VAL
6 quarters	25	x	$25x$
9 dimes	10	$x+3$	$10(x+3)$
3 nickels	5	$\frac{1}{2}x$	$\frac{5}{2}x$
12 pennies	1	$2x$	$2x$

$$25x + 10(x+3) + \frac{5}{2}x + 2x = 267$$

$$25x + 10x + 30 + 2.5x + 2x = 267$$

$$39.5x + 30 = 267$$

$$39.5x = 237$$

$$x = 6$$