

Math 9 – Unit 4: Word Problems

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Lesson #4: Solving Word Problems Involving Cost

To solve a word problem involving cost, we will use a chart instead of a "LET" statement.

- a) Matthew has \$0.85 in nickels and dimes. He has 2 more nickels than dimes. How many of each coin does he have?

| coins | Amount | Value |
|-------------------|---------|---------------|
| nickels \$0.05 | $x + 2$ | $0.05(x + 2)$ |
| dimes \$0.10 | x | $0.10(x)$ |
| | | $= \$0.85$ |

$$0.05(x + 2) + 0.10x = 0.85$$

$$0.05x + 0.10 + 0.10x = 0.85$$

$$0.15x = 0.75 \Rightarrow x = 5$$

\therefore Matthew has
5 dimes and
7 nickels

- b) A jar contains \$18.50 in dimes and quarters. If there are 110 coins in the jar, determine the number of dimes and the number of quarters.

| Coins | Amount | Value |
|------------------|-----------|-----------------|
| Dimes 0.10 | x | $0.10x$ |
| Quarters 0.25 | $110 - x$ | $0.25(110 - x)$ |
| | | $= \$18.50$ |

\therefore the jar contains
60 dimes and
50 quarters

$$0.10x + 0.25(110 - x) = 18.50$$

$$0.10x + 27.5 - 0.25x = 18.50$$

$$-0.15x = -9$$

$$x = 60$$

c) Tickets to a concert cost \$9.00 for adults and \$6.50 for students. A total of 950 people paid \$7675.00 to attend. How many students attended the concert?

| Tickets | Amount | Value |
|----------------|-----------|-----------------------|
| Adult \$9 | $950 - x$ | $9(950 - x)$ |
| Student \$6.50 | x | $6.50(x)$ $= 7675$ |

$$x = 350$$

$\therefore 350$ students attended.

$$9(950 - x) + 6.50x = 7675$$

$$\boxed{8550} - 9x + 6.50x = 7675$$

$$\begin{array}{r} -9x \\ -2.5x \\ \hline -2.5 \end{array} \quad \begin{array}{r} -8550 \\ -875 \\ \hline -2.5 \end{array}$$

d) Timothy needed to do some Christmas shopping, so he took a hammer to his piggy bank and smashed it open. Timothy noticed that he has 4 times the amount of dimes than nickels, 8 more quarters than nickels, half the number of toonies than nickels, and twice the number of loonies as quarters. Timothy counted a total of \$55. How many of each coin does he have? (After doing this, Timothy added "Piggy Bank" to his Christmas list).

| Coins | Amount | Value | |
|----------|---------------|-------------------------------|----------|
| nickels | x | $\$0.05(x)$ | 10 |
| dimes | $4x$ | $\$0.10(4x)$ | 40 |
| quarters | $x + 8$ | $\$0.25(x + 8)$ | 18 |
| loonies | $2(x + 8)$ | $\$1(2(x + 8))$ | 36 |
| toonies | $\frac{x}{2}$ | $\$2\left(\frac{x}{2}\right)$ | 5 |
| | | | $= \$55$ |

$$0.05x + 0.10(4x) + 0.25(x + 8) + 2(x + 8) + 2\left(\frac{x}{2}\right) = 55$$

$$\underline{0.05x} + \underline{0.40x} + \underline{0.25x} + \boxed{2} + \underline{2x} + \boxed{16} + \underline{x} = 55$$

$$3.70x + 18 = 55$$

$$\begin{array}{r} 3.70x = 37 \\ \hline 3.7 \quad 3.7 \end{array}$$

$$x = 10$$