**Math 9 – Unit 4: Word Problems**

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**Lesson #3: Solving Word Problems involving Cost**

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**Learning Goal:** We are learning to solve 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?

| Coin | Value | Amount | Total Value Worth |
|---|---|---|---|
| nickel | $0.05 | $x+2$ | $0.05(x+2)$ |
| dime | $0.1 | $x$ | $0.1x$ |

Value (Amount)

Equation:

$$0.05(x+2) + 0.1x = 0.85$$

$$0.05x + 0.1 + 0.1x = 0.85$$

$$0.15x + 0.1 = 0.85$$

$$-0.1 \quad -0.1$$

$$\frac{0.15x}{0.15} = \frac{0.75}{0.15}$$

$$x = 5$$

∴ 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.

10 dimes, 100q (110 − 10)

40 dimes, 70q (110 − 40)

x d, (110 − x)

| Coin | Value | Amount | Total |
|---|---|---|---|
| Dimes | $0.1 | $x$ | $0.1x$ |
| Quarters | $0.25 | $110-x$ (left over) | $0.25(110-x)$ |

Equation: $0.1x + 0.25(110-x) = 18.50$

$$0.1x + 27.5 - 0.25x = 18.50$$

$$-0.15x + 27.5 = 18.50$$

$$-27.5 \quad -27.5$$

$$\frac{-0.15x}{-0.15} = \frac{-9}{-0.15} \Rightarrow x = 60$$

∴ There are 60 dime and 50 quarters in the jar.

adults ↑ students

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 | Value | Amount | $ total |
|---|---|---|---|
| Adult | $9 | 950 − x | 9(950 − x) |
| Student | $6.50 | x | 6.5x |

Equation:

$9(950-x) + 6.5x = 7675$

$8550 - 9x + 6.5x = 7675$

$8550 - 2.5x = 7675$

$-8550 \quad -8550$

$-2.5x = -875$

$-2.5 \quad -2.5$

$x = 350$

∴ 350 students come to the concert

600 adults came as well.

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).

| Coin | Value | Amount | $ Total | |
|---|---|---|---|---|
| dimes | $0.1 | 4x | 0.1(4x) | 40 |
| nickels | $0.05 | x | 0.05x | 10 |
| quarters | $0.25 | x + 8 | 0.25(x + 8) | 18 |
| loonies | $1.00 | 2(x + 8) | 2(x + 8) | 36 |
| toonies | $2.00 | $\frac{x}{2} = 0.5x$ | $2\left(\frac{x}{2}\right) = x$ | 5 |

Equation:

$0.1(4x) + 0.05x + 0.25(x+8) + 2(x+8) + x = 55$

$0.4x + 0.05x + 0.25x + 2 + 2x + 16 + x = 55$

$3.7x + 18 = 55$

$-18 \quad -18$

$3.7x = 37$ → $\frac{3.7x}{3.7} = \frac{37}{3.7}$

$x = 10$

**Success Criteria:**

- I can write the value of common coins as a decimal (Quarter = 0.25, etc...)
- I can set up a chart to represent the given information and unknowns