



Problem of the Week

Problem A and Solution

Counting Coins

Problem

The Coyne family keeps a jar on the counter to hold spare change. At the end of each week, everyone in the family puts any coins they have in the jar. At the end of each month they empty the jar and donate the money to a local charity.

At the end of last month the Coyne family counted the coins in their jar and noticed the following totals:

- There were twice as many toonies as quarters.
- There were 3 times as many loonies as toonies.
- There were 5 more dimes than toonies.
- There were 4 fewer nickels than quarters.
- There were 8 quarters in the jar.

(a) How *many coins* were in the jar at the end of last month?

(b) How *much money* was in the jar at the end of last month?

NOTE: In Canada, a nickel is worth 5 cents, a dime is worth 10 cents, a quarter is worth 25 cents, a loonie is worth 100 cents, and a toonie is worth 200 cents. Also, 100 cents is equal to 1 dollar (\$1).

Solution

To solve this problem we need to determine how many of each type of coin we have.

Since there were twice as many toonies as quarters and there were 8 quarters, then there were $8 \times 2 = 16$ toonies in the jar.

Since there were 3 times as many loonies as toonies and there were 16 toonies, then there were $16 \times 3 = 48$ loonies in the jar.

Since there were 5 more dimes than toonies and there were 16 toonies, then there were $16 + 5 = 21$ dimes in the jar.

Since there were 4 fewer nickels than quarters and there were 8 quarters, then there were $8 - 4 = 4$ nickels in the jar.



In summary, there were 4 nickels, 21 dimes, 8 quarters, 48 loonies, and 16 toonies in the jar at the end of the month.

- (a) In total there were $4 + 21 + 8 + 48 + 16 = 97$ coins in the jar at the end of the month.
- (b) To determine the amount of money in the jar, we will first calculate the total value of each type of coin by multiplying the coin's value by the number of that type of coin in the jar.

Type of Coin	Value of One Coin (<i>in cents</i>)	Number of Coins	Total Value (<i>in cents</i>)
Nickel	5	4	$5 \times 4 = 20$
Dime	10	21	$10 \times 21 = 210$
Quarter	25	8	$25 \times 8 = 200$
Loonie	100	48	$100 \times 48 = 4800$
Toonie	200	16	$200 \times 16 = 3200$

The total amount of money amount in the jar was:

$20 + 210 + 200 + 4800 + 3200 = 8430$ cents, which is equal to \$84.30.