



Problem of the Week

Problem C and Solution

Gimme Some Change

Problem

Jean gave Karyna a bag of coins containing only nickels (5 cent coins) and dimes (10 cent coins). The total value of all the coins in the bag was \$11 and there were 16 more nickels than dimes in the bag.

How many coins in total were in the bag?

NOTE: In Canada, 100 cents is equal to \$1.

Solution

Solution 1

In this solution, we will solve the problem without using algebra.

The bag had 16 more nickels than dimes. These 16 nickels are worth $16 \times 5 = 80$ cents, or \$0.80. The remaining $\$11.00 - \$0.80 = \$10.20$ would be made up using an equal number of nickels and dimes. Each nickel-dime pair is worth 15 cents, or \$0.15. By dividing \$10.20 by \$0.15 we determine the number of nickel-dime pairs that are required to make \$10.20. Since $\$10.20 \div \$0.15 = 68$, we need 68 nickel-dime pairs. That is, we need 68 nickels and 68 dimes to make \$10.20. But there were 16 more nickels in the bag. Therefore, there were a total of $68 + 68 + 16 = 152$ coins in the bag.

Solution 2

In this solution, we will solve the problem using algebra.

Let d represent the number of dimes. Since there were 16 more nickels than dimes in the bag, then there were $(d + 16)$ nickels in the bag. Since each dime is worth 10 cents, the value of d dimes is $10d$ cents.

Since each nickel is worth 5 cents, the value of $(d + 16)$ nickels is $5(d + 16)$ cents. The bag contains a total value of \$11 or 1100 cents. Therefore,

$$\text{Value of Dimes (in cents)} + \text{Value of Nickels (in cents)} = \text{Total Value (in cents)}$$

$$10d + 5(d + 16) = 1100$$

$$10d + 5d + 80 = 1100$$

$$15d = 1100 - 80$$

$$15d = 1020$$

$$d = 68$$

$$d + 16 = 84$$

Therefore, there were 68 dimes and 84 nickels for a total of $68 + 84 = 152$ coins in the bag.