



## Problem of the Week Grade 7 and 8

### More Change Is Upon Us Solution

#### Problem

Notta Looney has 45 coins with a total value of \$1.95. The coins are nickels, dimes and pennies. She has twice as many pennies as dimes and five more nickels than dimes. How many nickels does Notta have?

#### Solution

At first, this problem appears similar to the problem in week 5, “A Time For Change”. In that problem we were trying to find the number of different possible combinations. A systematic approach worked very well.

But in this problem we are looking for a single solution. A systematic approach is far less suitable. This problem is solved more efficiently using an algebraic approach.

Let  $d$  represent the number of dimes Notta has.

Since she has twice as many pennies as dimes, Notta has  $2d$  pennies.

Since she has five more nickels than dimes, she has  $d + 5$  nickels.

Since the total number of coins is 45, the number of dimes plus the number of pennies plus the number of nickels totals 45 coins. Therefore,  $d + 2d + d + 5 = 45$ . This simplifies to  $4d + 5 = 45$  or  $4d = 40$  or  $d = 10$ . From here  $2d = 20$  and  $d + 5 = 15$ .

**Therefore, Notta has 10 dimes, 20 pennies and 15 nickels.**

We can use the total value to check the accuracy of our solution.

Number of Dimes	Number of Pennies	Number of Nickels	
10	20	15	
Value of Dimes	Value of Pennies	Value of Nickels	Total Value
$0.10 \times 10 = \$1.00$	$0.01 \times 20 = \$0.20$	$0.05 \times 15 = \$0.75$	\$1.95

