Problem of the Week
Grade 7 and 8

A Time For Change
Solution

Problem

A customer purchased some cough candies for $1.73 and paid for them with a two-dollar coin. The cashier made the correct change using only pennies, nickels, dimes and quarters. In how many different ways can the cashier make change?

Solution

This is a good problem for applying a systematic approach.

The amount of change required is $2 - \$1.73 = \$0.27$ or 27 cents. In order to get to 27 a minimum of 2 pennies are required. We can systematically look at all of the possibilities using pennies. The number of pennies given must end in a 2 or a 7 so that when this number is subtracted from 27 the result will be a number ending in 0 or 5. This result can then be achieved using nickels, dimes or quarters. Therefore, we can use 2, 7, 12, 17, 22 or 27 pennies. The following chart presents the possibilities.

Number of Pennies	Number of Nickels	Number of Dimes	Number of Quarters
2	0	0	1
2	1	2	0
2	3	1	0
2	5	0	0
7	0	2	0
7	2	1	0
7	4	0	0
12	1	1	0
12	3	0	0
17	0	1	0
17	2	0	0
22	1	0	0
27	0	0	0

$\therefore$ there are 13 different ways to make the correct change.