**Answer to P126 Five Coins**

There are 21 possible solutions:

1p + 2p + 5p + 10p + 20p = 38p
1p + 2p + 5p + 10p + 50p = 68p
1p + 2p + 5p + 10p + £1 = £1.18
1p + 2p + 5p + 20p +50p = 78p
1p + 2p + 5p + 20p + £1 = £1.28
1p + 2p + 5p + 50p + £1 = £1.58
1p + 2p + 10p + 20p + 50p = 83p
1p + 2p + 10p + 20p + £1 = £1.33
1p + 2p +10p +50p + £1 = £1.63
1p + 2p +20p +50p + £1 = £1.73
1p + 5p + 10p + 20p + 50p = 86p
1p + 5p + 10p + 20p + £1 = £1.36
1p + 5p + 10p + 50p + £1 = £1.66
1p + 5p + 20p + 50p + £1 = £1.76
1p + 10p + 20p + 50p + £1 = £1.81
2p + 5p + 10p + 20p + 50p = 87p
2p + 5p + 10p + 20p + £1 = £1.37
2p + 5p + 10p + 50p + £1 = £1.67
2p + 5p + 20p + 50p + £1 = £1.77
2p + 10p + 20p + 50p + £1 = £1.82
5p + 10p +20p + 50p + £1 = £1.85

**Notes**

This is quite a challenging problem with many solutions. A systematic approach is essential if pupils are to find all of the possible answers. Working together would also add to success.

A systematic approach might involve adding the five coins of least value to start with, then exchanging the highest value of the coins used (the 20p) for the coin next highest in value (the 50p), and then swapping the 50p for the £1. The next step would be to keep the three lowest coins but exchange the 10p for the 20p and add the 50p to these, then swap the 50p for the £1 and so on.

In this problem, it should be evident to children that the order of the coins is not important as it doesn't affect the total value (and the problem asks us to find as many different total amounts as we can).

Another way to think about it:

If you pick 5 coins from 7 you are effectively choosing 2 coins to leave out.
You can choose the first coin to leave out in 7 ways.
You can choose the second coin to leave out in 6 ways
Therefore, you can pick these 'left out' coins in 7 x 6 =42 ways
But all answers are duplicated (because eg picking a 1p coin to leave out followed by a 2p coin is the same as picking a 2p coin to leave out followed by a 1p coin).
42 ÷ 2 = 21

Some children may find it helpful to have plastic or real coins of the required denominations to manipulate.

The resource on the following page may be useful to some pupils to track what they have tried (perhaps by crossing out the coins used in each case). Do give pupils an opportunity to think about the problem for themselves before this resource is made available to them.

A simplified version of the problem is provided below.
There are many other problems in the Problem Bank involving money.