Problem

Kamara has \$5.10 worth of stamps. She has an equal number of 50¢, 20¢, 10¢, and 5¢ stamps.

a) How many 50¢ stamps does she have?

b) Kamara has to mail six letters that require 65¢ postage and one larger item that requires \$1.15 postage. Can she mail all seven items without needing more stamps than she has? Explain.

Hints

Part a)

Hint 1 - What would be the value of 1 of each stamp? of 2 of each?

Hint 2 - Could there be an odd number of stamps? (Think about the 5¢ stamps. . .)

Hint 3 - Could Kamara have only two of each stamp? only four? (Make a chart for several different numbers of stamps. Remember Kamara has the same number of each stamp.)

Part b)

Hint 1 - What combinations of stamps could be used to make the 65¢ required for one letter?

Hint 2 - Might Kamara put more than the required amount of postage on one of the items she wishes to mail?

Solution

a) By trial and error, we find that Kamara has 6 of each type of stamp,
since $(6 \times 50¢)+(6 \times 20¢)+(6 \times 10¢)+(6 \times 5¢)= \$3.00 + \$1.20 + \$0.60 + \$0.30 = \$5.10$

Ways the students may reason:

1.

		Values of Stamps					
	no. of each stamp	50¢	20¢	10¢	5¢	Total Value	
Value	2	100¢	40¢	20¢	10¢	170¢ or \$1.70	Too low.
Value	5	250¢	100¢	50¢	25¢	425¢ or \$4.25	Still too low, but closer.
Value	6	300¢	120¢	60¢	30¢	510¢ or \$5.10	She has 6 of each.

2. One of each stamp will have a value 85¢.
Two of each stamp will have a value \$1.70.
Three of each stamp will have a value \$2.55.
Since \$2.55 is one-half of \$5.10, Kamara must have 6 of each stamp.

A more elegant solution: One of each stamp will have a total value of 85¢ .
$\$5.10 \div 85¢ = 6$. Therefore she has 6 of each stamp.

b) Kamara needs $6 \times 65¢ + \$1.15 = \$3.90 + \$1.15 = \$5.05$. Since this is less than \$5.10 worth of stamps she has, some students may assume the answer to the question is 'yes'. To get 65¢ postage for six letters, Kamara could use 6 each of the 50¢, 10¢, and 5¢ stamps. This would leave her with 6 of the 20¢ stamps, or \$1.20. So if she were willing to sacrifice the extra payment, she could just use all of these to mail the \$1.15 item.
However, there is no way to get the *exact* postage on all the items to be mailed, since all six letters require a 5¢ stamp to make 65¢, and the \$1.15 item would also require a 5¢ stamp.