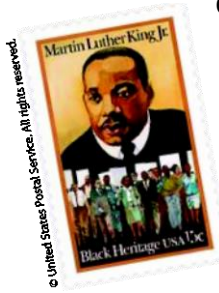


MATHCOUNTS[®] Problem of the Week Archive

First Class Postage – January 17, 2022

Problems & Solutions



Civil Rights leader and Nobel Prize winner Martin Luther King, Jr. was born January 15, 1929. On January 13, 1979, a 15-cent stamp was issued by the United States Postal Service as part of the Black Heritage Series of commemorative stamps. In 1979, it cost 15¢ to mail a first class letter weighing up to 1 ounce, and the current cost to mail a first class letter weighing no more than 1 ounce is 58¢. Suppose \$24,965,250 worth of the Black Heritage King stamps have been issued by the USPS.

Using only those 15-cent commemorative King stamps that have been issued how many first class letters weighing up to 1 ounce each could be mailed today?

*We are told that it currently costs 58 cents to mail a first class letter (weighing up to 1 ounce). Since we are only to use the commemorative King stamps, which are valued at 15 cents each, we must use 4 stamps per letter to have sufficient postage. Therefore, each letter will contain $4 \times 15\text{¢} = 60\text{¢}$ worth of postage. To determine how many letters we can mail using four King stamps per letter, we need to divide the value of the total number of issued commemorative stamps by 60¢. Doing so yields $\$24,965,250 \div 0.60 = 41,608,750$. Therefore, **41,608,750** first class letters using four commemorative King stamps each could be mailed.*

What is the total amount of money that would be saved by using a combination of commemorative 15-cent King stamps, 10-cent stamps and 1-cent stamps to mail the same number of first class letters weighing up to 1 ounce each?

*Using a combination of 15-cent King stamps, 10-cent stamps and 1-cent stamps allows us to use exactly 58¢ to mail each letter. One such way to do this is $3(15\text{¢}) + 1(10\text{¢}) + 3(1\text{¢}) = 58\text{¢}$. Therefore, it would cost $41,608,750 \times 0.58 = \$24,133,075$ to mail the same number of letters as in the previous problem using 58¢ worth of postage per letter. The total amount saved would be $\$24,965,250 - \$24,133,075 =$ **\$832,175**.*

*Another way to look at the problem is to consider that there were 2¢ lost on each of the 41,608,750 letters mailed, so using a combination of stamps, $41,608,750 \times 0.02 =$ **\$832,175** would be saved.*

What is the percent decrease in the total number of letters that can be mailed using \$24,965,250 worth of first class postage today compared to 1979 when the commemorative King stamp was first issued? Express your answer as a percent to the nearest tenth.

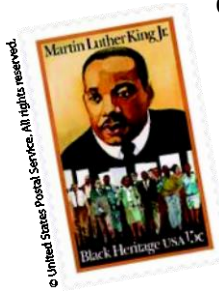
We are told that when the commemorative King stamp was first issued in 1979, the cost to mail a first class letter was 15¢. Thus, it would take one 15-cent King stamp to mail a letter. This means that the

\$24,965,250 worth of commemorative stamps issued would mail a total of $\$24,965,250 \div 0.15 = 166,435,000$ letters. It costs 58¢ to mail a first class letter today, so that same $\$24,965,250$ would be enough to mail $\$24,965,250 \div 0.58 = 43,043,534.482759 \approx 43,043,534$ letters. The difference in the total number of letters is $166,435,000 - 43,043,534 = 123,391,466$. The percent decrease is therefore $123,391,466 \div 166,435,000 = 0.7413793132 \approx \mathbf{74.1\%}$.

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