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## MathEdge Level Contest Sample Problems

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### Intermediate Level Sample Problems:

- 1) A number has a remainder of 1 when divided by 4, a remainder of 2 when divided by 5, and a remainder of 3 when divided by 6. What is the smallest number that has the above properties?

**ANS: 57**

**SOL:** The number asked is 3 short of the common multiple divisible by 4,5, and 6.  
Thus, the number =  $LCM(4,5,6) - 3 = 60 - 3 = 57$ .

- 2) The sum of two whole numbers is 2002. The two numbers have the same first digit and the same last digit. Their first digits do not have to be the same as their last digits. No whole number has first digit 0. How many choices are there for the two numbers?

**ANS: 22**

**SOL:** Since the last digit of the sum is 2, the last digit of the two whole numbers must be either 1 or 6. It is also pretty clear that the first digit of the two numbers must be 1, since at least one of the two numbers must have four digits, and 2001 and 1 do not have the same first digit. So the possibilities are:

- $1001 + 1001$
- $1991 + 11$
- $\left. \begin{array}{l} 1901 + 101 \\ 1891 + 111 \\ \bullet 1881 + 121 \\ \vdots \\ 1811 + 191 \end{array} \right\} 10 \text{ choices}$
- $1986 + 16$
- $\left. \begin{array}{l} 1896 + 106 \\ 1886 + 116 \\ \bullet \vdots \\ 1806 + 196 \end{array} \right\} 10 \text{ choices}$

So there are 23 choices for the two numbers.

**Note:** if the two numbers are assumed to be different, then we don't include  $1001 + 1001$ , and the answer will be 22 choices.

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