

1. Let N be the smallest positive integer with the following condition: its last digit is 4, and if we remove this last digit and place it as its first digit, the result is $4N$ (four times the number). Find the sum of the digits of this number.

A) 15 B) 18 C) 21 D) 22 E) 24

Solution: B) We start multiplying this number by 4, starting at the last digit.

$$\begin{array}{r} 4 \cdot 4 \\ \hline 6 \end{array}$$
 so the digit before the 4 is a 6. Insert this digit and continue multiplying.

$$\begin{array}{r} 4 \cdot 64 \\ \hline 56 \end{array}$$
 so the next digit is 5. Insert this digit and continue multiplying.

$$\begin{array}{r} 4 \cdot 564 \\ \hline 256 \end{array}$$
 so the next digit is 2. Insert this digit and continue multiplying.

$$\begin{array}{r} 4 \cdot 2564 \\ \hline 0256 \end{array}$$
 so the next digit is 0. Insert this digit and continue multiplying.

$$\begin{array}{r} 4 \cdot 02564 \\ \hline 10256 \end{array}$$
 so the next digit is 1. Insert this digit and continue multiplying.

$$\begin{array}{r} 4 \cdot 102564 \\ \hline 410256 \end{array}$$
 I think this is our number N .

$$(4)(102564) = 410256$$

Source: I think I saw this problem years and years ago in a KOMAL. (KOMAL is a Hungarian mathematical journal.)