



Problem of the Week

Problem E

A Lot of Zeros

For a positive integer n , the product of the integers from 1 to n can be written in abbreviated form as $n!$, which we read as “ n factorial”. So,

$$n! = n \times (n - 1) \times (n - 2) \times \cdots \times 3 \times 2 \times 1$$

For example,

$$6! = 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 720, \text{ and}$$

$$11! = 11 \times 10 \times 9 \times \cdots \times 3 \times 2 \times 1 = 39\,916\,800.$$

Note that $6!$ ends in one zero and $11!$ ends in two zeros.

Determine the smallest positive integer n such that $n!$ ends in exactly 1000 zeros.

