MAΘ Competition Team Problem Set 2

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Problem 1. Evaluate 5!, 6!, 7!, and 8!

Problem 2. How many trailing zeros does 100! have in base 10?

Problem 3. Find the greatest power of 3 dividing $\binom{100}{40}$.

Problem 4. How many zeros are at the end of the base-15 representation of 50!?

Problem 5. How many zeros are at the end of $(2025!)^2$?

Problem 6. Challenge Let n be a positive integer greater than 4 such that the decimal representation of $n!$ ends in k zeros and the decimal representation of $(2n)!$ ends in $3k$ zeros. Let s denote the sum of the four least possible values of n. What is the sum of the digits of s?