

**Problem statement** If  $n$  is sufficiently large, the following functions of  $n$  can be arranged in an increasing order, so that each function is very much larger than the one preceding it. List the functions below in order of size from smallest to largest.

$$n; n^n; \ln n; 4^n; 2^n; n \ln n; 2^{(n^2)}; \sqrt{n^6 + 1}; (n^3 + 1)^{2/3}.$$

Where would  $n!$  fit in this list?