

**The Ninth Grade Math Competition Class**  
**Factorials**  
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1. Find the largest integer value of  $n$  for which  $8^n$  evenly divides  $100!$ .

2. Find the prime factorization of  $10!$ .

**3.** What is the product of the positive divisors of  $7!$ .

4. How many positive cubes divide  $3!5!7!$ .

5. For how many positive integers  $n$  less than or equal to 24 is  $n!$  evenly divisible by  $1 + 2 + \cdots + n$ ?

6. In how many zeros does the decimal expansion of  $100^{100} - 100!$  end?

7. Let  $P$  be the product of the first 100 positive odd integers. Find the largest integer  $k$  such that  $P$  is divisible by  $3^k$ .