

**The Ninth Grade Math Competition Class**  
**Prime Factorization 1**  
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1. What is the smallest positive integer  $N$  such that the value  $7 + 30N$  is not a prime number?

2. The product of a set of positive integers is 140. What is their least possible sum?

3. Find the greatest natural number that must be a divisor of any common multiple of 14, 26 and 66.

4. The product of any two of the possible integers 30, 72 and  $N$  is divisible by the third. What is the smallest possible value of  $N$ ?

5. How many divisors of 5400 are not multiples of any perfect square greater than 1?

6. How many of positive divisors of 45000 themselves have exactly 12 positive divisor?

7. If  $m$  has 10 positive divisors,  $n$  has 6 positive divisors, and  $\gcd(m, n) = 1$ , how many positive divisors does  $mn$  have?

8. If  $n$  has exactly 7 positive divisors, how many positive divisors does  $n^2$  have?



9. How many of the positive divisors of 168 are even?

**10.** Show that any positive perfect square has an odd number of positive divisors?