1. Find five different positive integers, two of which are less than 100, such that each has exactly 12 distinct positive integer factors.
2. For the integer $(2^{10})(3^5)$, compute the number of
   (a) even factors
   (b) perfect square factors
   (c) perfect cube factors
3. Find the smallest positive integer k such athat 990 divides $k!$
4. How many multiples of 7 or 11 are there between 1 and 1000?
5. Find the remainder when 7^{105} is divided by 10.
6. A Pythagorean Right Triangle (PRT) is a right triangle all of whose sides have positive integer lengths. Find all PRT's having a hypotenuse of 65.
7. Ten fair coins are tossed once. What is the probability of getting precisely 4 heads and 6 tails?
8. How many arrangements are there of the letters of the word ORANGE such that
   (a) the letters O and R must be together?
   (b) the letters O and R may not be together?
9. How many positive integers N, where $1 \leq N \leq 1000$, do not contain the digit 7?
10. How many solutions (x, y, z) are there of $x+y+z = 10$, where x, y and z are positive integers? Note: (1,2,7) and (2,1,7), for example, represent different solutions.
11. Show that the repunit $111 \cdots 11$ containing exactly 91 1's is composite.
12. Compute the largest prime factor of $3^{14} + 3^{13} - 12$