# QW1 CPE 01

1. What is the greatest power of 6 that will divide 120! completely?

**(Cncp : No. - Highest Power)**

2. Find the smallest number that should divide 200!, so that it becomes odd number?

**(Cncp : No. - Highest Power)**

3. Find the number of factors of 7777.

**(Cncp : No. – Factors)**

# QW1 CPE 01 EXPLANATIONS

**1.** Let us write 6 as product of primes so $6 = 2 \times 3$
Highest power of 2 in 120! = $120/2 + 120/2^2 + 120/2^3 + 120/2^4 + 120/2^5 + 120/2^6$
$= 60 + 30 + 15 + 7 + 3 + 1 = 116$
Highest power of 3 in 120! = $120/3 + 120/3^2 + 120/3^3 + 120/3^4 = 40 + 13 + 4 + 1 = 58$
Therefore, the highest power of 6 that will divide 120! Is 58, because to get a 6 we need a pair of 2 and 3 and only 58 such pairs are available in 120!

**2.** to make the number odd, we have to remove all even powers from 200!
Highest power of 2 in 200! = $200/2 + 200/2^2 + 200/2^3 + 200/2^4 + 200/2^5 + 200/2^6 + 200/2^7$
$= 100 + 50 + 25 + 12 + 6 + 3 + 1 = 197$
So 200! Should be divided by $2^{197}$ to make it odd

**3.** Let number $N = a^p \times b^q \times c^r \times \ldots$ , where a , b , c are prime numbers
Then the number of factors of $N = (p+1)(q+1)(r+1)\ldots..$
As $7777 = 7 \times 11 \times 101$
So number of factors of $7777 = (1+1) \times (1+1) \times (1+1) = 2 \times 2 \times 2 = 8$.