Activity

Grade X

Mathematics

1. Check whether 6^n can end with the digit 0 for any natural number n.
   Solution: $6^n = (2 \times 3)^n = 2^n \times 3^n$
   Prime factors of 6 are 2 and 3.

   for 6^n to end to digit zero prime factorisation of 6^n should contain the prime number 5. Therefore there is no natural number n for which 6^n ends with digit zero.

2. Check whether 4^n, can end with the digit 0 for any natural number n.
   Solution: $4^n = (2\times 2)^n = 2^n \times 2^n$
   Prime factors of 4 are 2 and 2. For 4^n to end in digit zero prime factorisation of 4^n should contain the prime number 5. Therefore, there is no atural number n for which 4^n ends with the digit zero.
3. Find the LCM of 306 and 657. (OR) Write the smallest number which is divisible by both 306 and 657.
   Solution: First find the HCF (306,657) by prime factorisation.
   $306 = 2 \times 3 \times 3 \times 17 = 2 \times 3^2 \times 17$
   $657 = 3 \times 3 \times 73 = 3^2 \times 73$
   ∴ HCF 9306,6570 =9.
   By formula : HCF×LCM=Product of two numbers.
   ∴ 9×LCM=306×657
   LCM $= \frac{306\times657}{9} = 306 \times 73 = 22338$
4. Find the HCF and LCM of 6 and 20 by prime factorisation method.
   Solution : $6 = 2^1 \times 3^1$
   $20 = 2\times 2 \times 5 = 2^2 \times 5^1$ of
   ∴HCF (6,20)=2 [Product of the smallest power of each common prime factor in the numbers]
   LCM (6,20) $= 2\times 2 \times 3 \times 5 = 60$
   [ie product of the greatest power of each prime factor]
5. Find the HCF and LCM of 96 and 404 by prime factorisation.
   Solution: $96 = 2x2x2x2x2x3 = 2^5x3^1$
   $404 = 2x2x101 \quad = 2^2x101^1$
   $HCF(96,404) = 2^2 = 4$
   $LCM(96;404)2^5x3^1x101^1 = 32x3x101 = 9696$
   (OR)
   LCM $= \frac{96\times404}{HCF} = \frac{96\times404}{4} = 96 \times 101 = 9696$
6. Find the HCF and LCM of 6,72 and 12 using the prime factorisation method.

solution\; $6 = 2^1 x3$

$72 = 2x2x2x3x3 = 2^3 x3^2$

$120 = 2x2x2x3x5 = 2^3 x3^1 x5^1$

Here 2^1 and 3^1 are common

$\therefore$ HCF (6,72,120)= $2^1 x3^1 = 6$

Here 2^3, 3^2 and 5^1 are greatest powers.

$\therefore LCM\ (6,72,120) = 2^3 \times 3^2 \times 5^1 = 8 \times 9 \times 5 = 360$

7. Explain why 7x11x13+13 and 7x6x5x4x3x2x1+5 are composite numbers.

   Solution:(i) 7x11x13+13=13 (7x11+1) = 13x(77+1) = 13x78 =13x13x2x3

   Factorisation of the number contain more than one prime.

   : The given number is a prime number.

   (ii) 7x6x5x4x3x2x1+5

   =5(7x6x4x3x2x1+1)

   =5(1008+1)=5x1009

   Factorisation of the number contains more than one prime.

   $\therefore$ This is a composite number.

Home work.

1. Check whether 9^n can end with the digit 0 for any natural number n.\
2. Factorise using prime factors:

   (i) 7429 (ii) 32760
3. Find the HCF and LCM of the following numbers.

   (i) 26 and 91 (ii) 510 and 92
4. Find the LCM and HCF of the following integers using prime factorisation.

   (i) 12,15 and 21 (ii) 17,23 and 29
5. Find the LCM and HCF of 288 and 1212 and verify that HCF x LCM= product of the two given numbers.