IMPORTANT QUESTIONS

Q1. If xy = 180 and HCF (xy) = 3, find the LCM(xy)

HCF x LCM = PRODUCT OF NUMBERS

LCM = PRODUCT/ HCF = 180/3 = 60

Q2. Three bells ring at an interval of 4,7 and 14 minutes. All three bell rang at 6 am. When will the three bells will ring together next?

4 = 2 x 2; 7 = 1x7; 14= 2 x7

LCM(4,7 &14) = 2 x 2 x7 = 28

Hence, the bell will ring together again at 6.28am

IMPORTANT QUESTIONS

Q3. The HCF, of two numbers a and b, is 5 and their LCM is 200. Find the product ab?

HCF x LCM = PRODUCT OF NUMBERS

Product of Nos = 5 x 200 = 1000

Q4. Three bells red, green and yellow flash at intervals of 80, 90, 110 seconds. All three flash together at 8.00 am. When will these bulbs flash together again?

$80 = 2^4 \times 5$; $90 = 2 \times 3^2 \times 5$; $110 = 2 \times 5 \times 11$

$LCM(80,90,110) = 2^4 \times 3^2 \times 5 \times 11 = 7920$ seconds

= 7920/60= 132 min = 2 hour 12 min

Three bulbs will flash together again at 10.12 am

Q5. PROVE THAT √5 IS IRRATIONAL

PROOF

1. **Let us assume that √5 is rational**
2. **Hence √5 = a/b, where a & b (b≠0) are coprime numbers.**
3. **Squaring on both sides, we get 5 =a^2 /^{b2}**

$a^2 = 5\ b^2$ ……..(1)

therefore, we can write a =5c for some integer c.

4. Substituting for a, we get $25c^2 = 5\ b^{2,}$ that is, $b^2 = 5\ c^2$ …..(2)

5. From equation (1) & (2), a & b have at least 5 as a common factor, by theorem 1.3

6. This contradicts our assumption that √5 is a rational number

7. Hence √5 is irrational

Q6. Write whether $(2\sqrt{45} + 3\sqrt{20})/ 2\sqrt{5}$ on simplification gives a rational number or an irrational number?

$(2\sqrt{45} + 3\sqrt{20})/ 2\sqrt{5} = (2$ **x** $\sqrt{(9 \times 5)} +$

$3\sqrt{(4 \times 5)}/ 2\sqrt{5} = (2 \times 3\sqrt{5} + 3 \times 2 \times \sqrt{5})/ 2\sqrt{5}$

$= (6\sqrt{5} + 6\sqrt{5})/ 2\sqrt{5} = 12\sqrt{5} / 2\sqrt{5} = 6$, which is a rational number

Q7. Can two numbers have 16 as their HCF and 360 as their LCM?. Give reasons

No. Since HCF of two numbers, is a factor of their LCM. Here, HCF 16 is not a factor of LCM 380.

Q8. The decimal expression of 15/400 will terminate after how many decimal places?.

$15/400 = (3x5)/(2^4 \ x \ 5^2) = 3x5x \ 5^2/(2^4 \ x \ 5^4)$

$= 15x25/10^4 = 375/10000 = 0.0375$

Hence, it will terminate after 4 decimal places.

Q9. The decimal expression of 14587/1250 will terminate after how many decimal places?.

$14587/1250 = 14587/(2x \ 5^4)$

$= 14587 \ x \ 2^3/(2^4 \ x \ 5^4)$

$= 14587 \ x8/(10^4) = 116696/10000$

Hence, it will terminate after 4 decimal places.

Q10. If two positive integers a and b are written as $a = x^3 y^2$ and $b = x y^3$; x and y are prime numbers. Find LCM(a, b)?

$a = x^3 y^2$ and $b = x y^3$

LCM = greatest power of numbers

LCM(a, b) $= x^3 y^3$

Q11. what is the HCF of smallest composite number and the smallest prime number?

The smallest composite number = 4 = 2x2

The smallest prime number = 2

HCF(4,2) = 2

Q12. If LCM(x,18) = 36 and HCF(x,18)=2, then find x?

LCM x HCF = product of numbers.

36 x 2 = 18x

x = 36x2/18 = 2 x2 = 4

Q13. The decimal expression of $27/ 2^3 5^4 3^2$ will terminate after how many decimal places?.

$27/ 2^3 5^4 3^2 = 3^3/ 2^3 5^4 3^2 = 3^1 \times 2/ 2^4 5^4$

$= 6/10^4 = 0.0006$

Hence, it will terminate after 4 decimal places.

Q14. The decimal expression of 6/1250 will terminate after how many decimal places?.

$6/1250 = 2x3/2x\ 5^4 = 2^4\ x3/\ 2^4\ x\ 5^4$

$=16x3/\ 10^4 = 48/10000 = 0.0048$

Hence, it will terminate after 4 decimal places.

Q15. Find the HCF of 612 and 1314 using prime factorisation.

$612= 2x2x3x3x17= 2^2x3^2x17;$

$1314 = 2x3x3x73 = 2x3^2x17$

$HCF(612,1314) = 2x3^2$

$= 18$

Q16. PROVE THAT $3-2\sqrt{2}$ IS IRRATIONAL, GIVEN THAT $\sqrt{2}$ IS IRRATIONAL

PROOF

1. **Let us assume that** $3-2\sqrt{2}$ **is rational**
2. **Hence** $3-2\sqrt{2}$ **= a/b, where a & b (b≠0) are co-prime numbers**

   $2\sqrt{2} = 3 - a/b$

   $\sqrt{2} = (3b-a)/2b$

3. **Since a and b are integers, we get (3b-a)/2b is rational and so, √2 is rational.**
4. **This contradicts the fact that √2 is irrational**
5. **This contradiction has arisen because of our incorrect assumption that** $3-2\sqrt{2}$ **is rational**
6. **Hence** $3-2\sqrt{2}$ **is irrational**

Q17. Explain why 3x5x7+7 is a composite number.

3x5x7+7 = 7(3x5x1+1)= 7x16, which has more than 2 factors. Hence, 3x5x7+7 is a composite number.

Q18. Find the largest number which divides 77 and 85 leaving remainder 7 and 5 respectively.

The required largest number is the HCF of (77-7) and (85-5)

70 = 2x5x7 ; 80 =2x2x2x2x5

HCF(70,80) = 2x5 = 10

Q19. Find the largest number which divides 285 and 1249 leaving remainder 9 and 7 respectively.

The required largest number is the HCF of

(285-7) and (1249-7)

276= 2x2x3x23 ; 1242 =2x3x3x3x23

HCF(276,1242) = 2x3x23=138

Q20. Find the largest positive integer that will divide 398, 436, 542 leaving remainders 7,11 and 15 respectively

391=17x23; 425=5x5x17; 527=17x31

HCF(391,425,527) =17

Q21. Find the largest number which divides 615 and 963 leaving remainder 6 in each case.

The required largest number is the HCF of (615-6) and (963-6)

609= 3x7x29 ; 957 = 3x11x29

HCF(609,957) = 3x29 = 87

Q22. If a= 2^3x3, b = 2x3, c = 3^nx5 and LCM(a,b,c)= 2^3x 3^2x5, then find n

LCM(a,b,c) = greatest power

LCM(a,b,c) = 2^3x 3^nx5= 2^3x 3^2x5

Therefore n=2

Q23. Find the smallest number by which √8 should be multiplied to get a rational number?

8= 2x2x2 ; if we multiply 8 with 2, we will get 16, which is a perfect square

$\sqrt{8} \times \sqrt{2} = \sqrt{16} = 4$

Hence the smallest number is √2

Q24. If $504 = 2^m \times 3^n \times 7^p$,then find the value of m-n+p?

$504 = 2^3 \times 3^2 \times 7^1 = 2^m \times 3^n \times 7^p$

Therefore m=3, n=2,p=1 ; m-n+p=3-2+1=2

Q25. Write the smallest number which is divisible by both 306 and 657?

306= 2x3x3x17 ; 657 = 3x3x73

LCM(306,657) =Highest powers

= 2x3x3x17x73= 22338

Q26. If p and q are prime numbers, then find HCF of p^3q^2 and p^2q

HCF = SMALLEST COMMON POWER

$HCF(p^3q^2, p^2q)= p^2q$

Q27. Find the least number that is divisible by first five even numbers.

The first 5 even numbers are 2,4,6,8,10

2=2; 4=2x2; 6=2x3; 8=2x2x2; 10 = 2x5

LCM(2,4,6,8,10) = 2x2x2x3x5 =120

Q28. The total number of factors of a prime number is ………….

= 2(the number itself and one)

Q29. The sum of exponents of prime factors in te prime factorisation of 196 is ……

196 = 2x2x7x7= 2^2 x 7^2

sum of exponents =2+2=4

Q30. The exponent of 2 in the prime factorisation of 144 is …….

144= 2x2x2x2x3x3= 2^4 x 3^2 ; Exponent of 2 =4

Q33. (2+√5)/3 is ………..number (ans = irrational)

Q34. The decimal form of 129/ $2^2 5^7 7^5$…………

= non-terminating non-repeating, since 7^5 is there in the denominator

Q35. The product of a rational number and irrational number ……..(irrational)

Q36. The sum of a rational number and irrational number ……..(irrational)

Q37. The product of two different irrational numbers is always

(a) Rational (b) irrational (c) both of the above (d) none of the above

Reason : $\sqrt{2} \times \sqrt{8} = \sqrt{16} = 4$ (rational)

$\sqrt{2} \times \sqrt{3} = \sqrt{6}$ (irrational)

Q38. If b=3, then any integer can be expressed as

(a) 3q, 3q+1, 3q+2 ; (b) 3q ; © none of the above, (d)3q+1

Q39. The product of three consecutive positive is divisible by (a) 4 (b) 6 © no common factor(d) only 1

1x2x3 = 6/6=1

2x3x4= 24/6 = 4

3x4x5=60/6= 10

4x5x6 = 120/6 =20

Q40. The set A =0,1,2,3,4,5,…. Represents the set of …. WHOLE numbers

Q41. For some integer p, every even integer is of the form (a) 2p+1 (b) 2p© p+1(d) p

Q42. For some integer p, every odd integer is of the form (a) 2p+1 (b) 2p© p+1(d) p

Q43. The product of two consecutive natural numbers is always (a) Prime number (b) even number (c) odd number (d) even or odd

1 x 2 = 2; 2x3=6; 3x4 = 12; 4x5 = 20; 5x6 = 30