Name of the Bundle	Intermediate Bundle V1	Subject	Aptitude
Topic	HCF & LCM	Last updated on	19 August 2024

LCM - LEAST COMMON MULTIPLE ; HCF - HIGHEST COMMON FACTOR

CONCEPT 1 – BASIC PROBLEMS

1) Find the LCM of 24, 36 and 72.
   a) 62
   b) 52
   c) 72
   d) 42

ANS: c) 72

Explanation:

METHOD 1: Prime factorisation

STEP 1: Let's first prime factorise every given number.

$24 \longrightarrow 6*4 = 2*3*2*2 = 2^3*3$.

$36 \longrightarrow 6*6 = 2*3*2*3 = 2^2*3^2$.

$72 \longrightarrow 12*6 = 2*3*2*2*3 = 2^3*3^2$.

STEP 2: Write all the factors with their highest power $\longrightarrow 2^3*3^2$.

LCM $= 2^3*3^2 = 8*9 = $ **72.**

METHOD 2:

STEP 1: Check whether the largest number is divisible by all other numbers.

STEP 2: If YES, Largest number will be the LCM.

STEP 3: If NO, try multiples of largest number until it is divisible by every other number.

$$\frac{72}{24} \;✅ \qquad \frac{72}{36} \;✅$$

Therefore, 72 will be LCM.

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METHOD 3:

STEP 1: Take out the common factors of all the given numbers even if it is between 2 numbers.

24,36,72 —> 12 (2, 3, 6) —> 24 (1,3,3) —> 72(1,1,1)

STEP 2: LCM = 72.

METHOD 4: Option checking - (Effective Method)

Take any number, try to split it into numbers so that we can check divisibility of those numbers easily.

24 = 8*3

Check options which can be divided by 3. opt c) & d) will be divisible by 3.

Check options which can be divided by 8. opt c) will be divisible by 8.

Therefore, opt c) 72 will be the LCM.

2) Find the LCM of 18, 24 and 60.

    a) 360
    b) 240
    c) 720
    d) 180

ANS: d) 180

Explanation:

METHOD 1: Prime factorisation

STEP 1: Let's first prime factorise every given number.

18 —> 9*2 = 3*3*2 = 3^2*2.

24 —> 6*4 = 2*3*2*2 = 2^3*3.

60 —> 10*6 = 2*5*2*3 = 2^2*5*3.

STEP 2: Write all the factors with their highest power —> 2^3*5*3^2.

LCM = 2^3*5*9 = 8*5*9 = 360.

METHOD 2:

STEP 1: Check whether the largest number is divisible by all other numbers.

STEP 2: If YES, Largest number will be the LCM.

STEP 3: If NO, try multiples of largest number until it is divisible by every other number.

1. $\frac{60}{18}$ ✗ $\frac{60}{24}$ ✗   2. $\frac{120}{18}$ ✗ $\frac{120}{24}$ ✅

3. $\frac{240}{18}$ ✗ $\frac{240}{24}$ ✅   4. $\frac{360}{18}$ ✅ $\frac{360}{24}$ ✅

Therefore, 360 will be LCM.

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METHOD 3:

STEP 1: Take out the common factors of all the given numbers even if it is between 2 numbers.

18,24,60 —> 6 (3, 4, 10) —> 12 (3,2,5) —> 12*3*2*5

STEP 2: LCM = 360.

METHOD 4: Option checking - (Effective Method)

Take any number, try to split it into numbers so that we can check divisibility of those numbers easily.

18 = 6*3

Check options which can be divided by 3. Every option will be divisible by 3.

18 = 9*2

Check options which can be divided by 9. opt a), opt c), opt d) will be divisible by 3.

24 = 8*3

Check options which can be divided by 8.opt a), opt c) will be divisible by 8.

LCM should be the **least** common multiple. Therefore 360 will be the answer.

Therefore, opt c) 360 will be the LCM.

3) Find the HCF of 24, 36 and 72.
    a) 32
    b) 12
    c) 72
    d) 24

ANS: b) 12

Explanation:

METHOD 1: Prime factorisation

STEP 1: Let's first prime factorise every given number.

24 —> 6*4 = 2*3*2*2 = 2^3*3.

36 —> 6*6 = 2*3*2*3 = 2^2*3^2.

72 —> 12*6 = 2*3*2*2*3 = 2^3*3^2.

STEP 2: Write Common factors with their least power —> 2^2*3.

HCF = 2^2*3 = 4*3 = **12.**

METHOD 2:

STEP 1: Check whether the smallest number is dividing all other numbers.

STEP 2: If YES, Smallest number will be the HCF.

STEP 3: If NO, try Factors of smallest number until it is dividing every other number.

1. $\frac{36}{24}$ ✗ $\frac{72}{24}$ ✅ 2. $\frac{36}{12}$ ✅ $\frac{72}{12}$ ✅

Therefore, 12 will be HCF.

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METHOD 3:

STEP 1: Take out the common factors of all the given numbers.

24,36,72 —> 12 (2, 3, 6)

STEP 2: HCF = 12.

METHOD 4: Option checking - (Effective Method)

Check whether every number is divisible by taking one by one option.

opt a) 24 will not be divisible by 32.

opt b) 24, 36, 72 will be divisible by 12.

opt c) 24 will not be divisible by 72.

opt d) 36 will not be divisible by 24.

Therefore, opt b) 12 will be the HCF.

4) Find the HCF of 18, 24 and 60.

    a) 6

    b) 4

    c) 12

    d) 3

ANS: a) 6

Explanation:

METHOD : Option checking - (Effective Method)

Check whether every number is divisible by taking one by one option.

opt a) 18, 24, 60 will be divisible by 32.

opt b) 18 will not be divisible by 4.

opt c) 18 will not be divisible by 12.

opt d) 18, 24, 60 will be divisible by 24.

HCF should be the **Highest Common Factor** . Therefore 6 will be the answer.

Therefore, opt a) 6 will be the HCF.

CONCEPT 2 – LCM, HCF OF FRACTIONS

$$LCM = \frac{LCM \; of \; Numerator}{HCF \; of \; Denominator} \quad HCF = \frac{HCF \; of \; Numerator}{LCM \; of \; Denominator}$$

CONCEPT 3 – LCM*HCF = PRODUCT OF 2 NUMBERS

5) The LCM of two numbers is 120, their GCD or (HCF) is 10 and one of the numbers is 30. Find the other number.

   a) 30
   b) 10
   c) 120
   d) 40

ANS: d) 40

Explanation:

LCM*HCF = PRODUCT OF 2 NUMBERS

$$120 * 10 = 30 * N_2$$

$$N_2 = 40.$$

6) The LCM of two numbers is 64699, their GCD or (HCF) is 97 and one of the numbers is 2231. Find the other.

    a) 2187
    b) 2813
    c) 2831
    d) 2381

ANS: b) 2813

Explanation:

LCM*HCF = PRODUCT OF 2 NUMBERS

$$64699 * 97 = 2231 * N_2$$

Check the unit digit to find the answer if the product is too big.

If the unit digit fails, try the last two digit multiplication.

UNIT DIGIT:

9*7 = 6**3** ; 1***3*** = 3.

Therefore, opt b) is the answer.

7) The HCF of two numbers is 1/5th of their LCM. If the product of the two numbers is 720, the HCF is _____.

   a) 20
   b) 12
   c) 15
   d) 18

ANS: b) 12

Explanation:

HCF =1/5 LCM; LCM = 5 HCF

Product of 2 numbers = 720

$$\text{Product of 2 numbers = HCF×LCM}$$

720 = HCF×5HCF

144 = x^2

x = 12

Hence HCF = 12

8) What is the greatest number that will divide 29,60 and 103 and will leave as remainder 5,12 and 7 respectively?

   a) 24
   b) 16
   c) 12
   d) 14

ANS: a) 24

Explanation:

HCF of (29−5), (60−12) & (103−7)

HCF of 24, 48 & 96

HCF = 24 = Greatest Number

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9) Find the greatest number which is such that when 76,151 and 226 are divided by it, the remainder are all alike. Find also the common remainder.

   a) 57,2
   b) 75,2
   c) 75,1
   d) 57,1

ANS: c) 75,1

Explanation: In this type of question, first you find the difference of a given number & then HCF of these numbers.

Difference of number:-

$$76 \quad 151 \quad 226 \quad 76$$
$$75 \quad\quad 75 \quad\quad 150$$
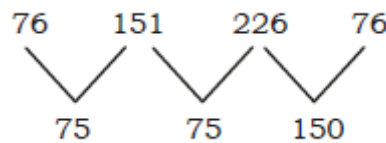
HCF of 75, 75, 150 is = 75

So 75 is the greatest number which when divided by these numbers the remainder is the same & when we divide 76 by 75 we find 1 is the remainder.

10) Find the smallest 3-digit number, such that it is exactly divisible by 3,4 and 5.

   a) 105
   b) 115
   c) 120
   d) 130

ANS: c) 120

Explanation: LCM of (3, 4 & 5) = 60

Smallest 3-digit number is 100. On dividing it by 60 we find that it is completely divisible when 20 is added in it.So 120 is the smallest 3-digit number which is exactly divisible by a given number.

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11) Find the smallest 3-digit number, such that when divided by 3,4 and 5, it leaves the remainder 2 in each case.

    a) 118
    b) 120
    c) 122
    d) 132

ANS: c) 122

Explanation:

LCM of (3, 4 & 5) = 60

Smallest 3-digit no is 100 on dividing it by 60 we find that it is completely divisible when 20 is added in it so exactly divisible number = 120

In order to get 2 as remainder in each case we will simply add 2 to 120

So the number is 122.

12) The difference between the Place value and the face value of 7 in the numeral 567823 is _____.

    a) 7
    b) 7000
    c) 693
    d) 6993

ANS: d) 6993

Explanation:

- Place value of 7 in 567823 = 7000.

- Face value of 7 in 567823 = 7.

- Difference between the Place value and the face value of 7 in the numeral 567823 = 7000 - 7 = **6993.**

13) Find the greatest number that will divide 43, 91 and 183 so as to leave the same remainder in each case.

    a) 4
    b) 7
    c) 9
    d) 13

ANS: a) 4

Explanation:

Required number = H.C.F. of (91 - 43), (183 - 91) and (183 - 43)

 H.C.F. of 48, 92 and 140 = 4.

14) The H.C.F. of two numbers is 23 and the other two factors of their L.C.M. are 13 and 14. The larger of the two numbers is ____.

    a) 276
    b) 299
    c) 322
    d) 345

ANS: c)322

Explanation:

HCF = Common factor of 2 numbers ; Therefore HCF will be in 2 numbers.

Clearly, the numbers are (23 x 13) and (23 x 14).

Larger number = (23 x 14) = 322.

15) The greatest number of four digits which is divisible by 15, 25, 40 and 75 is ____.

  a) 9000
  b) 9400
  c) 9600
  d) 9800

ANS: c) 9600

Explanation:

Option Checking:

Factors in 15,25,40,75 are 3,5,4.

opt a) Divisible by 3,5,4.

opt b) Not divisible by 3.

opt c) Divisible by 3,5,4.

opt d) Not divisible by 3.

They are asking for the greatest 4 digit number, therefore opt c) 9600 will be the answer.