

Teacher - Rani tell how will we know that the numbers 410 and 332 are divisible by 2?

Rani - By dividing.

Teacher - Very good! Now, Balvinder tell how will we know that 330 and 117 are divisible by 3?

Balvinder - Madam, by dividing the numbers.

Teacher - Very good! we can check the divisibility of numbers more easily without exactly dividing them.



Divisibility test of any numbers by 2,3,4,5,6,8,12 and 15

Divisibility test of any number by 2 -

In any number, if the digit at ones place is divisible by 2 exactly, will be divisible by 2 e.g. 510, 6452 etc.

Divisibility test of any number by 3 -

If the sum of digits of any number is divisible by 3, the given number will be divisible by 3. e.g. 729, 24129 etc.

Divisibility test of any number by 4 -

Look at the numbers 124, 3428, 100, 1200.

The number formed by the digits at ones and tens place of the first 2 numbers are 24 and 28.

These numbers get divided by 4 exactly or these are divisible by 4.

Thus, a number will be divisible by 4, if the number formed by the digits with ones and tens place is also divisible by 4. A number will also be divisible by 4 if the digits at ones and tens place are '0'.



Divisibility test of any number by 5 -

In any number if the digit at ones place is 0 or 5, it is divisible by 5 e.g. 340, 7890, 5785 etc.

Divisibility test of any number by 6 -

Look at the numbers 12, 36, 48, 300

These numbers are divisible by both 2 and 3.

Thus, these will also be divisible by 6, the product of 2 and 3.

The numbers which are divisible by both 2 and 3, are also divisible by 6.

Divisibility test of any number by 8 -

Look at the numbers 1000, 15000, 15128.

There is 0 at ones, tens and hundreds place in the numbers 1000 and 15000.

Both the numbers 1000 and 15000 are divisible by 8.

In number 15128, the digits at ones, tens and hundreds place form the number 128.

The number 128 is divisible by 8 because $128 \div 8 = 16$

Thus, in any number if the digits at ones, tens and hundreds place are 0, will be divisible by 8.

If the number formed by digits at ones, tens and hundreds place of the given number is divisible by 8, then the given number will also be divisible by 8.

Divisibility test of any number by 12 -

Look at the numbers 12, 36, 60.

These numbers are divisible by both 3 and 4.

So, these numbers will be divisible by 12 also.

Thus, the numbers which are divisible by both 3 and 4, will also be divisible by 12.

In the same way, we can test the divisibility of any number by 15. The numbers which are divisible by both 3 and 5 are also divisible by 15.



Least Common Multiple (L.C.M.)

L.C.M. by Prime Factorization Method

$$15 = 3 \times 5$$

(Here, 15 and 20 are factorised

$$20 = 2 \times 2 \times 5$$

in prime factors)

We see that the number '5' written in green band is a common factor
3, 2 and 2 are not the common factors of the given numbers.

To find the L.C.M., we multiply the common factors with all the other factors which are not common. The product found is the L.C.M.

$$\begin{aligned}\text{Thus, L.C.M.} &= 5 \times 2 \times 2 \times 3 \\ &= 60\end{aligned}$$

Let's see this too -

L.C.M. of 8, 12 and 30

$$8 = 2 \times 2 \times 2$$

$$12 = 2 \times 2 \times 3$$

$$30 = 2 \times 3 \times 5$$

For Least Common Multiple :

- First of all, we multiply the factors which are common in the factors of at least two of the given numbers
e.g. 2 written in the green band, 2 written in the red band and 3 written in the yellow band are common.

$$2 \times 2 \times 3$$

- Then we also multiply the factors which are not common with the common factors. Thus, the product obtained by this way is the L.C.M. .

$$2 \times 2 \times 3 \times 2 \times 5 = 120$$

Thus, 120 is the L.C.M. of 8, 12 and 30.

Highest Common Factor (H.C.F.) or Greatest Common Divisor (G.C.D.)

Look at the numbers given below and write the answer -

1, 3, 10, 18, 19

- Which of the numbers are even?
- Which of the numbers are odd?
- Which of the numbers are prime?
- Are 18 and 19 co-prime numbers?
- Which of the numbers are composite?
- Which of the numbers are neither composite nor the prime?

H.C.F. by Prime Factorization Method

Let's see- Prime factorization of 15 and 18

$$15 = 3 \times 5$$

(Here 15 and 18 are factorized into prime numbers)

$$18 = 2 \times 3 \times 3$$

The method in which any number is divided into its prime factors is called the prime factorization method.

- Finding H.C.F of 8, 12 and 16 by factorization method-

$$8 = 2 \times 2 \times 2$$

$$12 = 2 \times 2 \times 3$$

$$16 = 2 \times 2 \times 2 \times 2$$

We saw that in the prime factors of 8, 12 and 16 the number 2 in the green band and number 2 in the yellow band are common factors of all the 3 numbers.

The product of these common factors will be the H.C.F. .

$$\text{Thus, } 2 \times 2 = 4$$

Therefore, H.C.F. of the given numbers 8, 12 and 16 is 4.



Do it yourself -

Find the H.C.F. by prime factorization method-

- 5 and 15

- 12, 21 and 24

The Multiplication of LCM and HCF of two given numbers is equal to the multiplication product of those numbers. For example-

The LCM of 8 and 12 = 24 and the HCF of 8 and 12 = 4

Test:- First number $\times$ second number = LCM $\times$ HCF

$$8 \times 12 = 24 \times 4$$

$$\text{or } 96 = 96$$



Word Problems

Example 1: Students of a class can be divided into groups of 16, 24 or 36.

Minimum, how many students will be present in the class?

Look : Total number of students in the class will be equal to the L.C.M. of the given numbers.

Thus, we will have to find the L.C.M. of 16, 24 and 36 -

On factorization-

$$16 = 2 \times 2 \times 2 \times 2$$

$$24 = 2 \times 2 \times 2 \times 3$$

$$36 = 2 \times 2 \times 3 \times 3$$

$$\text{L.C.M. of } 16, 24 \text{ and } 36 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 = 144$$

Thus, total number of students in the class = 144

Example 2: There is 28, 56 and 84 litres of oil in 3 vessels respectively. Find the maximum capacity of the container that can measure the oil of all the 3 vessels exactly.

Look - We will have to find the H.C.F. of 28, 56 and 84 to measure the capacity of the container that can measure the oil of the three vessels exactly.

On factorization-

$$28 = 2 \times 2 \times 7$$

$$56 = 2 \times 2 \times 2 \times 7$$

$$84 = 2 \times 2 \times 3 \times 7$$

$$\text{H.C.F. of } 28, 56 \text{ and } 84 = 2 \times 2 \times 7 = 28$$

Thus, maximum capacity of the container is 28 litres.

We have learnt

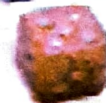
- To find the multiples and factors of the given numbers.
- To find the L.C.M. and H.C.F. of 2 or 3 digit numbers by factorization method.

Exercise



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- Which of the following numbers are divisible by 2, 3 and 6 -
(a) 60 (b) 96 (c) 75 (d) 82
- Find the smallest digit that can be written in the numbers given below to make them divisible by 3 -
(a) 53 ____ 35 (b) 387 ____ (c) 3 ____ 45
- The length of a red ribbon is 30 cm and that of white ribbon is 42 cm. Find the length of the longest piece that can be cut from both the ribbons.
- Find the greatest number that can divide 80 and 90 exactly.
- Some books are kept in the cupboard. If these books are kept in groups of 10, 15 and 24, then the complete groups are formed. Find the minimum number of books in the cupboard.
- Find the smallest three digit number that is divisible by 4, 8 and 16 exactly.
- Three bells ring at the time interval of 8, 12 and 15 seconds respectively. Find out after how many seconds will all the three bells ring together?





1. Solve -

(a) $5435404 + 3387868$

(b) $2214342 + 6148330$

(c) $5645320 - 2130978$

(d) $9633211 - 8956478$

(e) 407×205

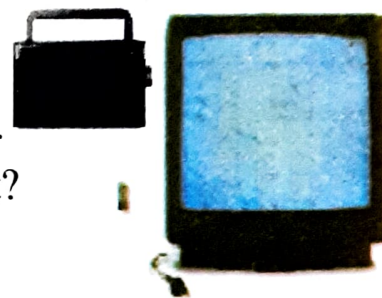
(f) 62058×29

(g) $9043407 \div 217$

(h) $861747 \div 301$

2. Write the greatest and the smallest 6 digit numbers formed by the digits 1,2,3,6,8 and 9. Find the difference between the two numbers.

3. The cost of a transistor is ₹ 1160. The cost of a T.V. set is ₹ 7190 more than the cost of a transistor. What will be the total cost of a transistor and a T.V. set?



4. What should be added to 214368 to get 50 lakh?

5. The product of two numbers is 1425. If one of the numbers is 25, find the other number-

(a) 1450

(b) 1400

(c) 57

(d) 35625

6. After solving a problem of multiplication, Sujata told that the multiplier in this question is 999 and the product is 744255. Find the multiplicand.

7. A farmer has 5775 kg of rice. If 105 kg of rice can be filled in one sack, find the total number of sacks required to fill total quantity of rice.

8. A village got ₹ 1 lakh for its development. After spending ₹ 68905 on development work, the remaining amount was distributed equally among 9 families affected by storm. How much money did each family get?





9. The monthly income of Shanti is ₹ 3500. After keeping ₹ 2800 for monthly expenditure, she deposits the remaining amount in the post office. How many rupees did Shanti deposit in the Post office in two years?
10. In a factory, 240000 LED bulbs are manufactured in a year. If the number of bulbs manufactured in each month are equal, how many bulbs are manufactured in a month?
11. How many hours are there in 1800 minutes?
12. Find the H.C.F by factorization method -
- (a) 18 and 24 (b) 4, 8 and 12
- (c) 3, 7 and 9 (d) 14, 21 and 35
13. Find the L.C.M. of -
- (a) 3 and 5 (b) 8 and 25
- (c) 15, 25 and 30 (d) 5, 15 and 25
14. Find the smallest number that is divisible by 2, 3 and 5 exactly.
15. Find the greatest number that divides 15, 30 and 45 exactly.
16. Find the maximum capacity of the container that can measure 6, 8 and 10 litres of milk exactly.
17. Some flowers can be kept in the heaps of 54, 48 and 40. Find the minimum number of flowers.

