

Class Notes

Class - V

Topic - Chapter – 6

Subject - Mathematics

Be My Multiple, I'll be your factor

Note down the given works in your Maths Copy.

Factors:- A number which can divide another number exactly without leaving any remainder is called factor of that number. In other words a number is the factor of all its multiples.

Example:- Find all the factors of 36.

Here we can check $1 \times 36 = 36$ (so 1 and 36 are factors of 36)

$2 \times 18 = 36$ (so 2 and 18 are factors of 36)

$3 \times 12 = 36$ (so 3 and 12 are factors of 36)

$4 \times 9 = 36$ (so 4 and 9 are factors of 36)

$6 \times 6 = 36$ (so 6 is factor of 36)

→ All these numbers 1, 2, 3, 4, 6, 9, 12, 18 and 36 can divide 36 perfectly. Also in multiplication tables of these number 36 comes.

So factors of 36 = 1, 2, 3, 4, 6, 9, 12, 18, 36

Common factors:- The numbers which can divide two or more given numbers exactly are called the common factors. These numbers are present in the list of factors of given numbers.

Example:- Find all the common factors of 24 and 32.

Here we should first find all the factors of 24 and 32.

Factors of 24

1×24

2×12

3×8

4×6

Factors of 32

1×32

2×16

4×8

⇒ Factors of 24 = 1, 2, 3, 4, 6, 8, 12, 24

Factors of 32 = 1, 2, 4, 8, 16, 32

Common factors = 1, 2, 4, 8

Highest Common factor (H C F):- The highest common factor of two or more given numbers is the greatest among all of their common factors. HCF is also called the greatest common divisor or GCD because it will be the greatest perfect divisor.

Example:- Find all the factors, common factors, and highest common factor of 25, 35 and 40.

Method 1 : By listing the factors

⇒ Factors of 25 = 1, 5, 25

Factors of 35 = 1, 5, 7, 35

Factors of 40 = 1, 2, 4, 5, 8, 10, 20, 40

Common factors = 1, 5

Highest common factor = 5

Method 2 : By diagram (Venn diagram)

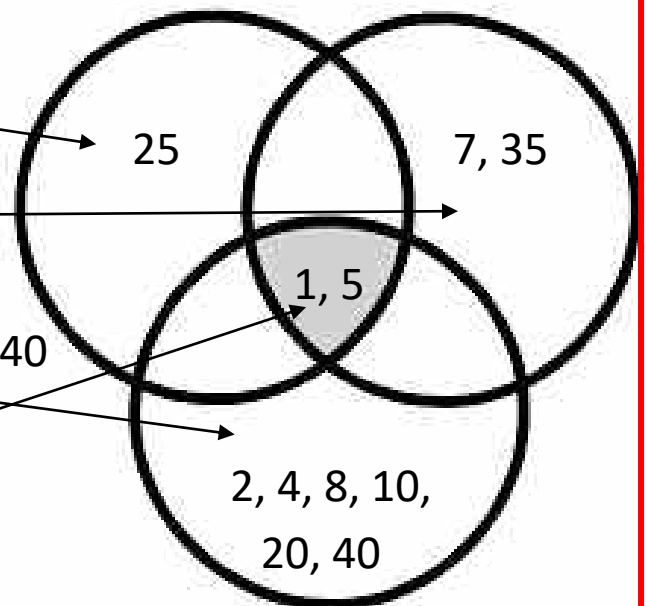
Factors of 25 = 1, 5, 25

Factors of 35 = 1, 5, 7, 35

Factors of 40 = 1, 2, 4, 5, 8, 10, 20, 40

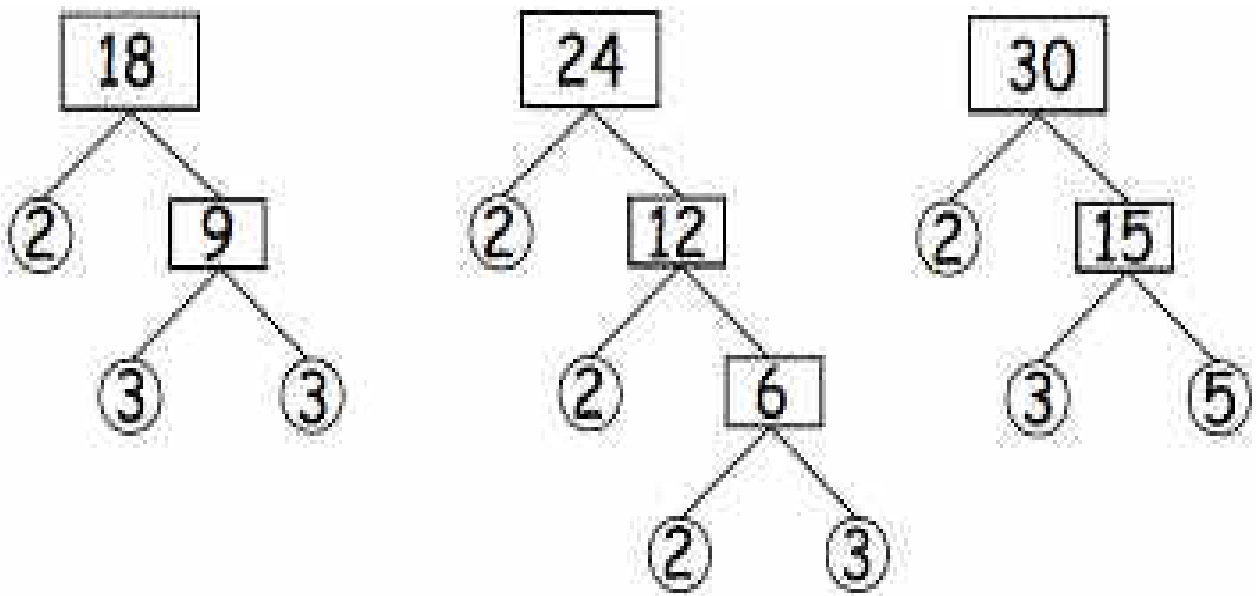
Common factors = 1, 5

Highest common factor = 5

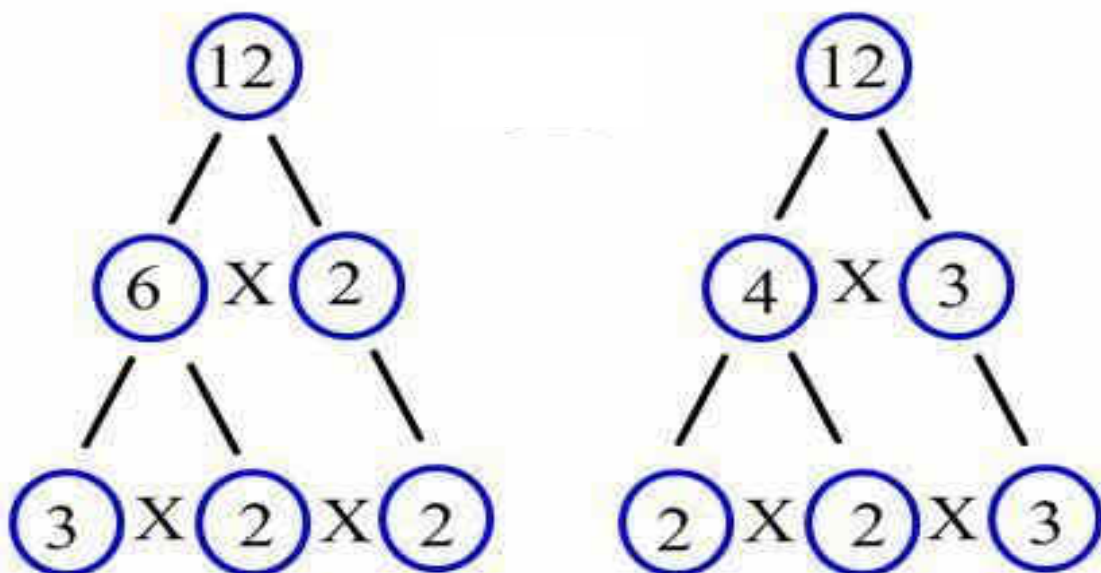


Factor tree:- It is the diagrammatic method of writing the factors of a number greater than one. For the same number we can have different factor trees as the way of putting the factors can change.

Example – Draw the factor trees of 18, 24 and 30.

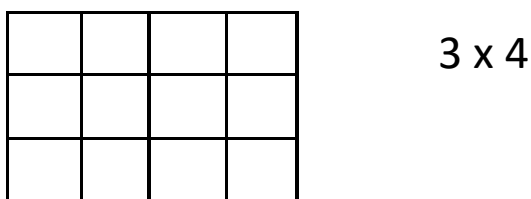
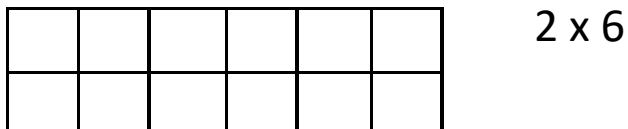
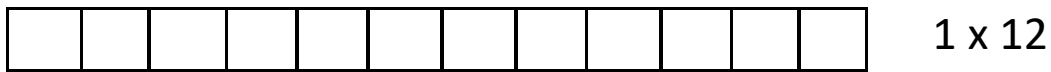


Example – Draw the factor trees of 12 and 48 in two different ways.



Factor by making rectangles:- For a given number we can also draw rectangles of proper number of grids.

Example – Write the factors of 12 by making them into as many rectangles as possible.



Points to remember

- 1 is the smallest factor of all the numbers. It is also called **universal factor** since it can divide every number exactly.
- 2 is the factor of all the even numbers.
- Factors of a number are countable. Factors are always equal or smaller than the given number.
- Multiples of a number is uncountable.
- All prime numbers have only 2 factors but the composite numbers have more than 2 factors.
- Two consecutive prime numbers having one composite number between them are called **Twin Primes**. Example - 3 and 5, 17 and 19, 5 and 7 etc.
- Two numbers which have only 1 as the common factor are called **Co primes** numbers. Example – 5 and 8, 14 and 25 etc

Practice questions

Q6. Find all the factors of given numbers.

(a) 20

Solution:- As we know $1 \times 20 = 20$, $2 \times 10 = 20$, $4 \times 5 = 20$

Factors of 20 = 1, 2, 4, 5, 10, 20

(b) 10 **(Do it yourself)**

(c) 80 **(Do it yourself)**

(d) 63 **(Do it yourself)**

(e) 56 **(Do it yourself)**

Q7. Find the common factors and highest common factor (HCF) of these numbers by listing the factors.

(a) 30 and 45

Solution:- Factors of 30 = 1, 2, 3, 5, 6, 10, 15, 30

Factors of 45 = 1, 3, 5, 9, 15, 45

Common factors = 1, 3, 5, 15

HCF = 15

(b) 60, 80 and 100

Solution:- Factors of 60 = 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60

Factors of 80 = 1, 2, 4, 5, 8, 10, 16, 20, 40, 80

Factors of 100 = 1, 2, 4, 5, 10, 20, 25, 50, 100

Common factors = 1, 2, 4, 5, 10, 20

$$\text{HCF} = 20$$

(c) 45 and 60

(Do it yourself)

(d) 15, 20 and 25

(Do it yourself)

(e) 28 and 35

(Do it yourself)

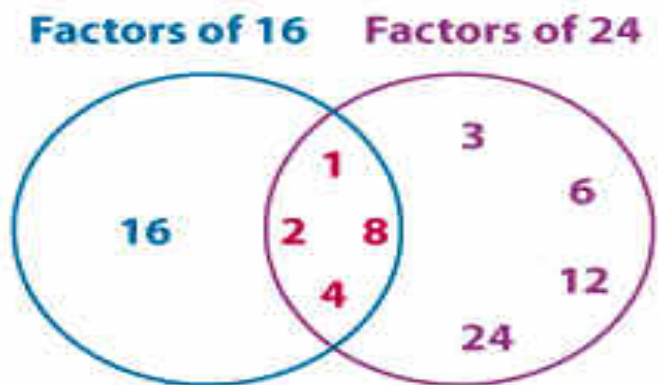
Q8. Find the common factors and highest common factor (HCF) of these numbers by diagram.

(a) 16 and 24

Solution:-

Common factors = 1, 2, 8, 4

Highest Common Factor = 4

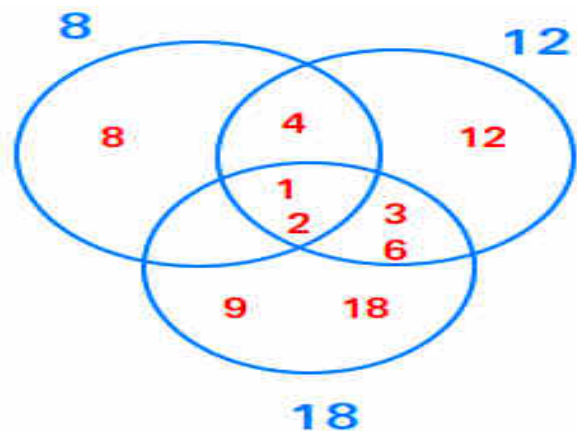


(b) 8, 12 and 18

Solution:-

Common factors = 1, 2

Highest Common Factor = 2

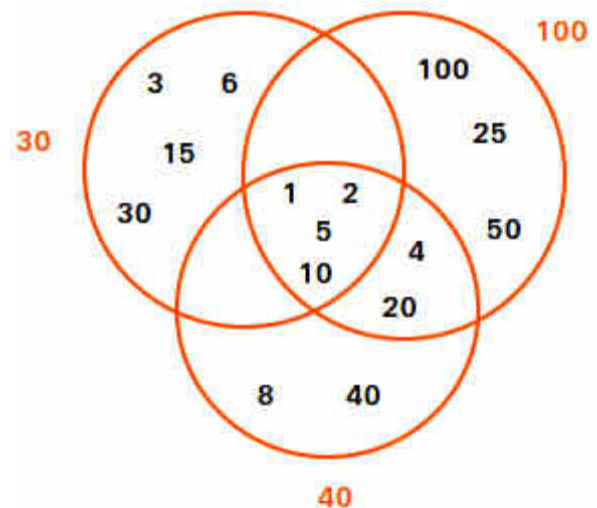


(c) 30, 40 and 100

Solution:-

Common factors = 1, 2, 5, 10

Highest Common Factor = 10



(d) 45, 75, 100

(Do it yourself)

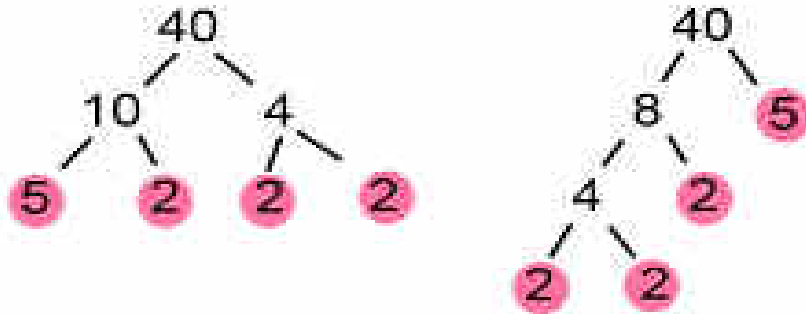
(e) 20, 30 and 50

(Do it yourself)

Q9. Make factor trees in two different ways for these numbers.

(a) 40

Solution:-



(b) 20

(Do it yourself)

(c) 32

(Do it yourself)

(d) 48

(Do it yourself)

(e) 16

(Do it yourself)

Word Problems

Q10. There is a garden in Anu's house. In the middle of the garden there is a path. They decided to tile the path using tiles of length 2 feet, 3 feet and 5 feet. The mason tiled the first row with 2 feet tiles, the second row with 3 feet tiles and the third row with 5 feet tiles. The mason has not cut any of the tiles. Then what is the shortest length of the path?

Solution- The shortest length of the path = LCM of 2, 3 and 5.

Multiples of 2 = 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30..

Multiples of 3 = 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, ...

Multiples of 5 = 5, 10, 15, 20, 25, 30, 35, 40...

Common multiples = 30, 60, 90...

LCM = 30

⇒ Shortest length of the path = 30 feet.

Q11. Manoj has made a new house. He wants to lay tiles on the floor. The size of the room is 9 feet x 12 feet. In the market, there are three kinds of square tiles: 1 foot x 1 foot, 2 feet x 2 feet and 3 feet x 3 feet. Which size of tile should he buy for his room, so that he can lay it without cutting ?

Solution:- Length of the room = 9 feet

Breadth of the room = 12 feet

Among all the tiles available 2 feet tiles cannot fit along 9 feet long floor as 2 is not a factor of 9. 1 and 3 are the factors of 9 and 12.

⇒ Manoj can buy the tiles of size 1 foot x 1 foot, or 3 feet x 3 feet. These will fit into floor without cutting.

Q12. Rani, Geetha and Naseema live near each other. The distance from their houses to the road is 90 feet. They decided to tile the path to the road. They all bought tiles of different designs and length. Rani bought the shortest tile, Geetha bought the middle sized one and Naseema bought the longest one. If they could tile the path without cutting any of the tiles, what is the size of the tiles each has bought? Suggest three different solutions.

Solution:- For the tiles to finish at 90 feet, it must be a factor of 90.

Factors of 90 = 1, 2, 3, 5, 6, 9, 10, 15, 18, 30, 45, 90

They can choose any of these factors as the length of the tiles.

	Soultion 1	Solution 2	Solution 3
Rani	1 foot	3 feet	2 feet
Geetha	2 feet	5 feet	3 feet
Naseema	3 feet	6 feet	5 feet

Workbook Questions

Note down the given works in your Maths Workbook.

RECAP

A. Fill in the blanks:

- All multiples of 2 are even numbers.
- Numbers which are not multiples of 2 are called odd numbers.
- Factors are also divisor of a number.
- 1 is the smallest factor of every number.
- The number itself is the greatest factor of a given number.
- 2 is a factor of every even number.
- A product of two given numbers is its multiples.
- Every number is a multiple of itself.
- Any number is a multiple of one.
- All multiples of a number are either greater than the given number, equal to the number or less than the given number.
- one is a factor of every number.
- A number is a factor of itself.
- Every factor of a number is either less than or equal to the given number.
- A factor of a number divide the number exactly without leaving a remainder.
- There are no factors greater than the given number.

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A. See the pattern and fill in the blanks:

(a)



3 6 9 12 15 18 21 24



(b)



7 14 21 28 35 42 49 56



(c)



9 18 27 36 45 54 63 72



(d)



13 26 39 52 65 78 91 104



B. Write the first 5 multiples of :

(a) 8 8, 16, 24, 32, 40

(b) 12 12, 24, 36, 48, 60

(c) 15 15, 30, 45, 60, 75

(d) 20 20, 40, 60, 80, 100

C. Fill in the blanks:

(a) $7 \times 8 = 56$, so 56 is a multiple of 7 and 8.

(b) $6 \times 9 = 54$, so 54 is a multiple of 6 and 9.

(c) $3 \times 12 = 36$, so 36 is a multiple of 3 and 12.

(d) $5 \times 4 \times 11 = 220$, so 220 is a multiple of 5, 4 and 11.