

Factors and Multiples.

Topic: Factors and Multiples. C.W#1

Factor: A factor is a number that divide other numbers without leaving any remainder.

For example:

$$16 \div 1 = 16$$

$$16 \div 2 = 8$$

$$16 \div 4 = 4$$

$$16 \div 8 = 2$$

$$16 \div 16 = 1$$

Here 1,2,4,8 and 16 are the factors of 16.

***Multiple:** A number is multiple of another number when it is exactly divisible by the other numbers.

For example:

$$3 \times 2 = 6, 6 \times 1 = 6, 2 \times 3 = 6$$

Here, 6 is the multiple of 1, 2, 3, 6

***Prime numbers:** A prime number is a number which is divisible by 1 and the number itself.

Ex: 2, 3, 5, 7, 11, 13, 17 etc.

***Composite numbers:** A composite number is a number which is divisible by more than two numbers.

Ex: 4, 6, 8, 9, 10, 12, 14, 15, 16, etc.

***1 is neither prime nor composite, it's an unique number.**

Each number has at least two factors, one is 1 and the other is the number itself.

***Prime Factors:** Factors of a number which are prime are called prime factors.

Factors of 36 are: 1,2,3,4,6,9,12,18,36.

Prime factors of 36 are 2,3

***Prime factors of a number can be found by repeated division by prime numbers**

Factor Tree: Prime factors of a number can also be found by factorizing in a pictorial form, called factor tree.

***Construct factor trees for the followings:**

1) 24

$$24 = 2 \times 2 \times 2 \times 3 \text{ (Ans)}$$

Least Common Multiple (LCM): The L C M of two or more given numbers is the smallest number which is divisible by all the given numbers.

For example:

The LCM of 6 and 8 is 24

Highest Common Factor (HCF): The H C F is the greatest number which can divide the given numbers without leaving any remainder.

For example:

The HCF of 7, 14 and 21 is 7

Topic: Factors and Multiples. C.W#2,3

The highest common factor (HCF) or greatest common divisor (GCD)

a) Prime factor method (PFM)

b) Successive division method (SDM)

1) Find the HCF of the following numbers using PFM:

EX. 1) 49, 70, 77 (By Prime factor method) :

$$\begin{array}{r|l} 7 & 49 \\ \hline & 7 \end{array}$$

$$\begin{array}{r|l} 2 & 70 \\ \hline 5 & 35 \\ \hline 7 & \end{array}$$

$$\begin{array}{r|l} 7 & 77 \\ \hline & 11 \end{array}$$

$$49 = 7 \times 7$$

$$70 = 2 \times 5 \times 7$$

$$77 = 7 \times 11$$

The H.C.F. of 49, 70 and 77 is - 7 (Ans)

Steps of finding HCF by SDM : (Successive Division Method)

- ▶ Divide the bigger number by the smaller number. The remainder is the called the first divisor.
- ▶ Divide the first divisor by the first remainder to get the second remainder.
- ▶ Divide the first remainder by the second remainder.
- ▶ Continue this process till you get 0 as the remainder.
- ▶ The last divisor is the HCF.

EX -3.3(PG# 37)(Find the HCF by SDM)

A. (6) 106, 192, 96

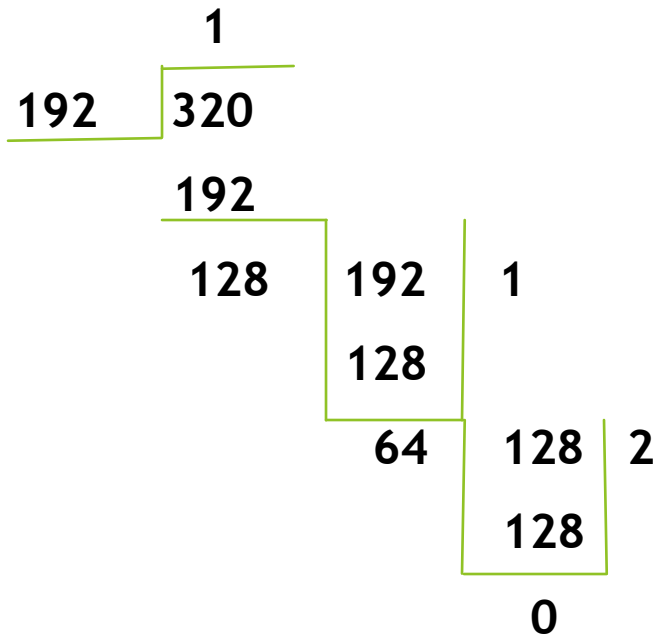
$$\begin{array}{r} 2 \\ 96 \overline{) 192} \\ \underline{192} \\ 0 \end{array}$$

$$\begin{array}{r}
 1 \\
 96 \overline{) 106} \\
 \underline{-96} \\
 10 \quad 96 \\
 \underline{90} \quad 9 \\
 6 \quad 10 \quad 1 \\
 \underline{6} \quad 6 \\
 4 \quad 6 \quad 1 \\
 \underline{4} \quad 4 \\
 2 \quad 4 \quad 2 \\
 \underline{2} \quad 4 \\
 0
 \end{array}$$

The HCF of 106, 192 and 96 is 2 (Ans)

EX-3.3 ,Pg-37

► A.3) 320,192



The HCF is 64 (Ans)

HW # 1, Pg # 37, Ex : 3.3 B(7,8)

Topic: Factors and Multiples. C.W#4

Q.B Find the HCF of the following numbers by SDM : (Ex-3-3,pg#37)

► 6).290, 203, 145

Now, 145 and 290

$$\begin{array}{r} 2 \\ 145 \overline{) 290} \\ \underline{290} \\ 0 \end{array}$$

Again, 145, 203

$$\begin{array}{r} 1 \\ 145 \overline{) 203} \\ \underline{145} \\ 58 \end{array} \quad \begin{array}{r} 2 \\ 145 \overline{) 58} \\ \underline{116} \\ 29 \end{array} \quad \begin{array}{r} 2 \\ 29 \overline{) 58} \\ \underline{58} \\ 00 \end{array}$$

The H C F of 290,203 and 145 is 29(Ans.)

9) 891, 1215, 1377

Now, 891 and 1377

$$\begin{array}{r} 1 \\ 891 \overline{) 1377} \\ \underline{891} \quad 1 \\ 486 \overline{) 891} \\ \underline{486} \quad 1 \\ 405 \overline{) 486} \\ \underline{405} \quad 5 \\ 81 \overline{) 405} \\ \underline{405} \end{array}$$

Again, 81 and 1215

$$\begin{array}{r} 15 \\ 81 \overline{) 1215} \\ \underline{81} \\ 405 \\ \underline{405} \\ 0 \end{array}$$

The HCF of 891, 1215 and 1377 is 81 (Ans.)

A(5) Find the HCF of 108, 144 and 60 by PFM and SDM.

H.W#2. B.(4,5)(PG# By SDM

Topic: Factors and Multiples. C.W#5

- ▶ **Steps for Division Method :**
- ▶ **Divide the numbers by the least prime number which divides at least one of the number.**
- ▶ **The number not divisible by prime number are written as it is.**
- ▶ **Continue dividing by the least prime no. till we get all 1's in a row.**
- ▶ **LCM is the product of all the divisors.**

Ex. 3.4, pg# 38

Q. A. Find the LCM of the following set of numbers by Division Method.

3) 39, 195

$$\begin{array}{r} 3 \overline{) 39, 195} \\ 5 \overline{) 13, 65} \\ 13 \overline{) 13, 13} \\ 1, 1 \end{array}$$

so, $3 \times 5 \times 13 = 195$

The LCM of 39 and 195 is 195(Ans.)

5) 105, 70

$$\begin{array}{r} 5 \overline{) 105, 70} \\ 3 \overline{) 21, 14} \\ 7 \overline{) 7, 14} \\ 2 \overline{) 1, 2} \\ 1, 1 \end{array}$$

so, $5 \times 3 \times 7 \times 2 = 210$

The LCM of 105 and 70 is 210

10) 75, 90, 125

3 | 75, 90, 125

5 | 25, 30, 125

5 | 5, 6, 25

5 | 1, 6, 5

2 | 1, 6, 1

3 | 1, 3, 1

1, 1, 1

So, $3 \times 5 \times 5 \times 5 \times 2 \times 3 = 2250$

The LCM of 75, 90, 125 is 2250(Ans.)

- ▶ Please learn the steps of LCM by Division Method
- ▶ H.W#3
- ▶ Ex- 3.4,PG# 38,A(11,13)

Topic: Factors and Multiples. C.W#6

Answer in short.

1. Which of the following numbers is a multiple of 3?

3, 7, 12, 22, 36, 43, 65, 72,

Ans. 3, 12, 36, 72

2. Write first 4 multiples of 7?

Ans. 7, 14, 21, 28

3. Find the prime numbers from the following set of numbers.

4, 7, 13, 15, 19, 21, 24, 27, 31, 49

Ans. 7, 13, 19, 31

4. Which of the following numbers is a factor of 12?

1, 4, 5, 6, 7, 9, 10, 11, 12

Ans. 1, 4, 6, 12

6. Which of the following numbers have only 2 factors?

3,6,10,11,13,15,16,17,19,20

Ans. 3,11,13,19

7. Which of the following numbers have more than 2 factors?

5,6,10,11,12,17,19,23, 27,29

Ans. 6,10,12, 27

8. Which is an unique number? Ans. 1

9. Find all factors of 15. Ans. Factors of 15 are 1,3,5 and 15.

10. Find the HCF of 7 and 14. Ans. 7

11. What is co-prime?

Ans: Two numbers are co-prime if they have only 1 as the common factor.

Find the LCM of 39, 52 and 65 by division method.

(pg#38,A. 15)

H.W#4,PG#38,A(14)