

CHAPTER # 01 :- (1)

Primes, Highest Common Factor and L.C.F

* Whole Numbers:

0, 1, 2, 3, 4,

(i) Even Numbers: (divisible by 2)

0, 2, 4, 6, 8,

(ii) Odd Numbers: (Not divisible by 2)

1, 3, 5, 7,

Prime Number:—

A number that is ^{only} divisible by 1

and itself is called Prime Number.

e.g. 2, 3, 5, 7, 11,
(odd except 2)

$$\begin{array}{r} 1 \overline{) 2} \\ \underline{2} \\ 0 \end{array} \quad \begin{array}{r} 1 \overline{) 2} \\ \underline{2} \\ 0 \end{array}$$

Remember:

1 is not a prime number.

2 is only even prime number.

2 ~~3~~

(a) 87

Solutions:-

87 is an odd number. So it is not divisible by 2, and other even numbers.

2^x 4^x 6^x 8^x 10^x , - - - - -

Now we check odd numbers one by one.

(i) 3

$$\begin{array}{r} 29 \\ 3 \overline{) 87} \\ \underline{6} \\ 27 \\ \underline{27} \\ \times \end{array}$$

It is divisible by 3.

So 87 is a composite number.

\checkmark 1 \checkmark 3 \checkmark 87

(b) 67

Solutions-

67 is an odd number so it is not divisible by 2 and other even numbers

~~2~~ ~~4~~ ~~6~~ ~~8~~ ~~10~~ ...

Now we check odd numbers one by one.

$$(i) \begin{array}{r} 22 \\ 3 \overline{) 67} \\ \underline{6} \\ 7 \\ \underline{6} \\ 1 \end{array}$$

$$(ii) \begin{array}{r} 11 \\ 5 \overline{) 67} \\ \underline{5} \\ 7 \\ \underline{5} \\ 2 \end{array}$$

$$(iii) \begin{array}{r} 7 \\ 9 \overline{) 67} \\ \underline{63} \\ 4 \end{array}$$

It is also not divisible by all odd numbers.

Hence 67 is a prime number.

(4)

(c) 73

It is odd number, so it is not divisible by 2.

2^x 4^x 6^x 8^x 10^x

Now we check odd numbers one by one.

(i) 3

$$\begin{array}{r} 24 \\ 3 \overline{) 73} \\ \underline{6} \\ 13 \\ \underline{12} \\ 1 \end{array}$$

(ii)

$$\begin{array}{r} 14 \\ 5 \overline{) 73} \\ \underline{5} \\ 23 \\ \underline{20} \\ 3 \end{array}$$

(iii) 7

$$\begin{array}{r} 10 \\ 7 \overline{) 73} \\ \underline{70} \\ 3 \end{array}$$

(iv)

$$\begin{array}{r} 8 \\ 9 \overline{) 73} \\ \underline{72} \\ 1 \end{array}$$

It is also not divisible by all odd numbers.

Hence 73 is a prime number

Question # 2. -

(a) 72

By L.C.M, we find factors.

2	72
2	36
2	18
3	9
3	3
	1

$$72 = 2 \times 2 \times 2 \times 3 \times 3$$

$$= 2^3 \times 3^2 \quad \text{Ans}$$

(b) 187

By L.C.F

11	187
17	17
	1


$$187 = 11 \times 17 \quad \text{Ans}$$

(c) 336

By L.C.M.

$$\begin{array}{r|l} 3 & 336 \\ \hline & 112 \end{array}$$

$$\begin{array}{r|l} 2 & 336 \\ \hline 2 & 168 \\ \hline 2 & 84 \\ \hline 2 & 42 \\ \hline 3 & 21 \\ \hline 7 & 7 \\ \hline & 1 \end{array}$$



$$336 = 2 \times 2 \times 2 \times 2 \times 3 \times 7$$

$$= 2^4 \times 3 \times 7 \quad \underline{\text{Ans}}$$



* Remember :

$\sqrt{\quad}$ is a square root $(\sqrt{\quad} = {}^2\sqrt{\quad})$

$\sqrt[3]{\quad}$ is a cube root.

Exercise 1 A

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Q#3:-

(a) $\sqrt{1764}$ → Square RootSolution:-

2	1764
2	882
3	442
3	147
7	49
7	7
	1

$$1764 = 2 \times 2 \times 3 \times 3 \times 7 \times 7$$

$$= 2^2 \times 3^2 \times 7^2$$

$$= (2 \times 3 \times 7)^2$$

$$1764 = (42)^2$$

Now

$$\sqrt{1764} = \sqrt{(42)^2}$$

$$\sqrt{1764} = 42 \text{ Ans}$$

Q# 3 part (b) Home Work.

Q# 3

(c) $\sqrt[3]{3375}$

→ cube root

Solution:-

3	3	3	7	5
3	1	1	2	5
3	3	7	5	
5	1	2	5	
5	2	5		
5	5			
				1

$$3375 = 3 \times 3 \times 3 \times 5 \times 5 \times 5$$

$$3375 = 3^3 \times 5^3$$

$$3375 = (3 \times 5)^3$$

Now

$$\sqrt[3]{3375} = \sqrt[3]{(3 \times 5)^3}$$

$$= 3 \times 5$$

$$\sqrt[3]{3375} = 15 \text{ Ans}$$

Q#4:- Given that the prime factorization of 9801 is $3^4 \times 11^2$, find $\sqrt{9801}$ without using a calculator.

Solution:-

$$\text{Given } 9801 = 3^4 \times 11^2$$

$$\sqrt{9801} = ?$$

$$\sqrt{9801} = \sqrt{3^4 \times 11^2}$$

$$= \sqrt{3^4} \times \sqrt{11^2}$$

$$= \sqrt{(3^2)^2} \times \sqrt{11^2}$$

$$= 3^2 \times 11$$

$$= 3 \times 3 \times 11$$

$$= 9 \times 11$$

$$\sqrt{9801} = 99 \quad \underline{\underline{\text{Ans}}}$$

Q5:- Given that the prime factorization of 21952 is $2^6 \times 7^3$, find $\sqrt[3]{21952}$ without using a calculator.

Solution:-

Given $21952 = 2^6 \times 7^3$.

$$\sqrt[3]{21952} = \sqrt[3]{2^6 \times 7^3}$$

$$\sqrt[3]{21952} = \sqrt[3]{2^6} \times \sqrt[3]{7^3}$$

$$= \sqrt[3]{(2^2)^3} \times \sqrt[3]{(7)^3}$$

$$= 2^2 \times 7$$

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

$$= 4 \times 7$$

$$\sqrt[3]{21952} = 28 \quad \underline{\text{Ans}}$$

Q#6 Estimate the value of each of the following. Page 11 for concept

(a) $\sqrt{66}$

We observe that 66 is close to 64 and 64 is a perfect square.

$$\begin{aligned} \text{So, } \sqrt{66} &\approx \sqrt{64} \\ &= \sqrt{(8)^2} \end{aligned}$$

\approx Approximately equal symbol.

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$$\sqrt{66} = 8 \text{ Ans.}$$

(c) $\sqrt[3]{218}$

We observe that 218 is close to 216 and 216 is a perfect cube.

$$\begin{aligned} \text{So, } \sqrt[3]{218} &\approx \sqrt[3]{216} \\ &= \sqrt[3]{(6)^3} \end{aligned}$$

$$\sqrt[3]{218} = 6 \text{ Ans.}$$

Q#7:- Use a calculator to evaluate each of the following, leaving your answer correct to 4 decimal places where necessary.

$$(a) \quad 7^2 - \sqrt{361} + 21^3$$

Solution:-

$$= (7 \times 7) - \sqrt{19 \times 19} + 21^3$$

19	361
19	19
	1

$$= 49 - \sqrt{(19)^2} + (21 \times 21 \times 21)$$

$$= 49 - 19 + 9261$$

$$= 30 + 9261$$

$$= 9291 \quad \underline{\text{Ans.}}$$

$$Q7(b) \frac{\sqrt{555} + 5^2}{2^3 \times \sqrt[3]{222}}$$

$$= \frac{23.56 + 25}{8 \times 6.06}$$

$$= \frac{48.56}{48.44}$$

$$= 1.0017 \text{ Ans.}$$



Exercise # 1B

Q1: Find the H.C.F of following sets of numbers.

(a) 12 and 30.

Solutions-

2		12	·	2		30
2		6		3		15
3		3		5		5
		1				1

$$12 = 2 \times 2 \times 3$$
$$30 = 2 \times 3 \times 5$$

$$\text{H.C.F of } 12 \text{ and } 30 = 2 \times 3$$
$$= 6 \text{ Ans.}$$

(b) 77, 91 and 143

Sol

7		77	7		91	11		143
11		11	13		13	13		13
		1			1			1

$$77 = 7 \times 11$$

$$91 = 7 \times 13$$

$$143 = 11 \times 13$$

$$\text{H.C.F of } 77, 91 \text{ and } 143 = 1 \text{ Ans}$$

(L.C.M)

2. Find the lowest common multiple of each of the following sets of numbers.

(a) 24 and 30 (choose higher index number)

Solution:-

2	24
2	12
2	6
3	3
	1

2	30
3	15
5	5
	1

24 = 2 x 2 x 2 x 3 = 2³ x 3

30 = 2 x 3 x 5 = 2 x 3 x 5

L.C.M of 24 and 30 = 2³ x 3 x 5

= 8 x 15

= 120 Ans.

(c) 12, 18 and 81

Solution:-

2	12
2	6
3	3
	1

2	18
3	9
3	3
	1

3	81
3	27
3	9
3	3
	1

12 = 2 x 2 x 3 = 2² x 3

18 = 2 x 3 x 3 = 2 x 3²

81 = 3 x 3 x 3 x 3 = 3⁴

L.C.M of 12, 18 and 81 = 2² x 3⁴

= 4 x 81

= 324 Ans