⇒ 1, 3, 6, 10, 15, 21 28 36 45

03/08/21

CH:- 2 Exploring Factors & Multiples

★ Summary

⇒ FACTORS : A number that can divide a given number exactly (without leaving any remainder) is called the factor of given number.

⇒ MULTIPLE : A Multiple of any natural number is a number formed by multiplying it by another natural number.

⇒ HCF AND LCM :

i) The largest number that exactly divides Two or more numbers is called their highest common factor (HCF) of the numbers.

ii) The smallest number that is divisible by two or more numbers, without leaving a remainder, is called the least common multiple (LCM) of the numbers.

c. 11,321

Ans 1 1 3 2 1

1 1 1 1 1

O E O E O

[1+3+1] - [1+2]

5 - 3

= 2 = Diff = 2

∴ 11,321 is not divisible by 11.

7. 8. Check if 14,382 is divisible by 6.

⇒ Rule :- A number is divisible by 6 if it is divisible by 2 and 3.

14382.

last digit is 2 so that number is divisible by 2.

∴ 14382 is divisible by 2 & 3

14382.

1+4+3+8+2

= 18

18 is divisible by 3

∴ 14382 is divisible.

∴ 14382 is divisible by 6.

b. 5922.

⇒ Rule :- A number is divisible by 6 if it is divisible by 2 and 3.

5922

last digit is 2 so that number is divisible by 2

∴ 5922 is divisible by 2 and 3.

∴ 5922 is divisible by 6.

5922.

5+9+2+2

= 18 is divisible by 3

8. Check if 28,092 is divisible by both 3 & 4.

i) Divisibility by 3.

Rule :- sum of the digits must be divisible by 3.

28092.

2+8+0+9+2

= 21 is divisible by 3

∴ 28092 is divisible by 3.

ii) Divisibility by 4.

28092.

92 ÷ 4 = 0

92 is divisible by 4.

∴ 28092 is divisible by 4.

$$\begin{array}{r} 23 \\ 4\overline{)92} \\ -8 \\ \hline 12 \\ -12 \\ \hline 0 \end{array}$$

i) D by 3

28682

2+8+6+8+2

= 26 is not divisible by 3

∴ 28682 is not divisible.

ii) D by 4.

28682.

VIII Find the greatest number that divides 149 and 325 remainders in each case..

⇒ 149 − 5 = 144

325 − 5 = 320.

2	144
2	72
2	36
3	18
3	9
3	3
	1

2	320
2	160
2	80
2	40
2	20
2	10
5	5
	1

IX Find the greatest number that divides 843 and 949 leaving remainders 3 and 9 respectively.

⇒ Leaving 3 and 9 remainders respectively

⇒ 843 − 3 = 840 949 − 9 = 940

2	840
2	420
3	210
7	70
5	10
2	2
	1

2	940
2	470
5	
47	47
	1

F.O :- 840 :- 2×2×2×3×5×7×1

F.O :- 940 :- 2×2×5×47×1

= 2×2×5×1 = 2

X Find the greatest number that divides 74, 112, 150 leaving remainders 2, 4 and 6 respectively.

VII Find the HCF using long division method.

Q.1 18, 54

$$18\overline{)54}\ (3,\quad -54,\quad 0$$

HCF = 3 ||

2. 54, 70.

$$54\overline{)70}\ (1,\quad -54,\quad 16\overline{)54}\ (3,\quad -48,\quad 06\overline{)16}\ (2,\quad -12,\quad 04\overline{)6}\ (1,\quad -4,\quad 2$$

HCF :- 2 ||

3. 45, 63

$$45\overline{)63}\ (1,\quad -45,\quad 18\overline{)45}\ (2,\quad -36,\quad 09\overline{)18}\ (2,\quad -18,\quad 0$$

HCF : 2, 09

4. 72, 48

$$48\overline{)72}\ (1,\quad -48,\quad 24\overline{)48}\ (2,\quad -48,\quad 0$$

HCF :- 2

5. 63, 90

$$63\overline{)90}\ (1,\quad -63,\quad 27\overline{)63}\ (2,\quad -54,\quad 09\overline{)27}\ (3,\quad -27,\quad 0$$

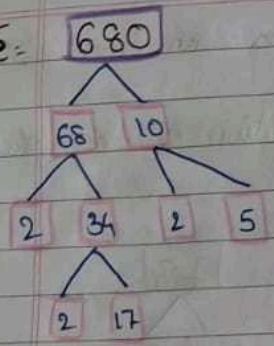
HCF = 3 ||

6. 225, 300

$$225\overline{)300}\ (1,\quad -225,\quad 075\overline{)225}\ (3,\quad -225,\quad 0$$

HCF = 3.

e. 680



$= 2 \times 2 \times 2 \times 5 \times 17 = 680$

II Which of the following prime factorization is / are correct ?

a. $60 = 15 \times 2 \times 2$
∴ There is a composite number
∴ It is not a prime factorization

b. $95 = 5 \times 19$
= 5 and 19 are prime factors.
∴ - Yes.

c. $240 = 2 \times 2 \times 3 \times 4 \times 5$.
= 4 is not prime factors
∴ No

d. $63 = 3 \times 3 \times 7$
= 3, 3 and 7 are prime factor.
∴ Yes

III Find the common factors and then find HCF.

a. 28, 30.
* F.O 28 :- 1, 2, 4, 7, 14, 28, ~~30~~
* F.O 30 :- 1, 2, 3, 5, 6, 10, 15, 30
HCF :- 2 //

b. 6, 40.
* F.O 6 :- 1, 2, 3, 6
* F.O 40 :- 1, 2, 4, 5, 10, 20, 40.
HCF :- 2 //

c. 18, 54.
* F.O 18 : 1, 2, 3, 6, 9, 18
* F.O 54 : 1, 2, 3, 6, 9, 18, 27, 54
HCF :- 18 //

d. 54, 270.
* F.O 54 :- 1, 2, 3, 6, 9, 18, 27,
* F.O 270 :- 1, 2, 7, 10, 35, 70
, HCF 2 //

V Find the HCF by using prime factorization method

a. 48, 198.

=>

2 | 48
2 | 24
2 | 12
2 | 6
3 | 3
1	

2 | 198
3 | 99
3 | 33
11 | 11
1	

F.O 48 :- 2x2x2x2x3x1
F.O 198 :- 2x3x3x11x1
= 2x3x3x1
HCF = 6 //

b. 76, 56.

2 | 76
2 | 38
19 | 19
1	

2 | 56
2 | 28
2 | 14
7 | 7
1	

F.O 76 = 2x2x19x1
F.O 56 = 2x2x2x7x1
= 2x2x1
HCF = 4 //

c. 7, 35, 165.

7 | 7
1	

7 | 35
5 | 5
1	

5 | 165
3 | 33
11 | 11
1	

F.O 7 = 7x1
F.O 35 = 7x5x1
F.O 165 = 5x3x11x1
= HCF = 1.

d. 54, 270.

2 | 54
3 | 27
3 | 9
3 | 3
1	

5 | 270
2 | 54
3 | 27
3 | 9
3 | 3
1	

F.O 54 :- 3x2x3x3x3x1
F.O 270 :- 5x2x3x3x3x1
= 2x3x3x3x1
HCF = 54 //

VI Find the HCF by the listing the factors

1. 27, 81.

=> F.O 27 :- 1, 3, 9, 27
F.O 81 :- 1, 3, 9, 27, 81
CF = 1, 9, 3, 27
HCF = 27.

2. 12, 16.

F.O 12 :- 1, 2, 3, 4, 6, 12
F.O 16 :- 1, 2, 4, 8, 16
CF :- 1, 2, 4
HCF :- 4.

3. 9, 27, 35.

F.O 9 :- 1, 3, 9
F.O 27 :- 1, 3, 9, 27
F.O 35 :- 1, 5, 7, 35
CF :- 1
HCF = 1 //

4. 6, 18, 32

F.O 6 :- 1, 2, 3, 6
F.O 18 :- 1, 2, 3, 6, 9, 18
F.O 32 :- 1, 2, 4, 8, 16, 32.
CF :- 1, 2
HCF :- 2 //

III Find the prime factors

a) 48

$= 2 \times 2 \times 2 \times 2 \times 3 \times 1$

2	48
2	24
2	12
2	6
3	3
	1

b) 198

$= 2 \times 3 \times 3 \times 11 \times 1$

2	198
3	99
3	33
11	11
	1

c) 81

$= 3 \times 3 \times 3 \times 3 \times 1$

3	81
3	27
3	9
3	3
	1

d) 56

$= 2 \times 2 \times 2 \times 7 \times 1$

2	56
2	28
2	14
7	7
	1

e) 72

2	72
3	36
2	12
2	6
3	3
	1

f) 36

$= 3 \times 2 \times 2 \times 3 \times 1$

3	36
2	12
2	6
3	3
	1

g) 100

2	100
2	50
5	25
5	5
	1

h) 128

2	128
2	64
2	32
2	16
13	13
	1

i) 135

3	135
5	45
3	9
3	3
	1

j) 243

3	243
3	81
3	27
3	9
3	3
	1

k. 105

5	105
3	21
7	7
	1

l. 121

11	121
11	11
	1

m. 144

2	144
2	72
2	36
2	18
2	9
3	3
	1

n. 625

5	625
5	125
5	25
5	5
	1

o. 117

3	117
3	39
13	13
	1

P.T.O

Summary.

⇒ PRIME FACTORIZATION
: Prime factorization is the process by which a composite number is rewritten as the product of its prime factors.

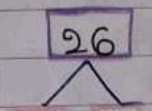
⇒ REMEMBER : Any composite number can be expressed as the product of prime numbers.

⇒ Highest common factor: The highest common factor of two natural numbers is the largest common factors, or divisor, of the given natural numbers. it in others words, the HCF is the greatest number of the set of common factors of the given numbers.

Ex: 2.3.

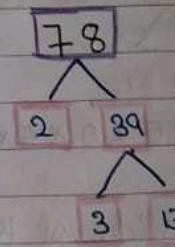
I Write the prime factorization of the following numbers.

1. 26



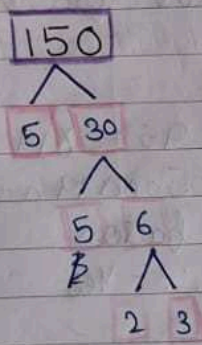
$= 13 \times 2 = 26$

2. 78



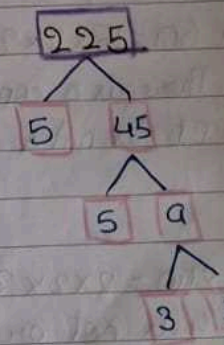
$= 2 \times 3 \times 13 = 78$

3. 150



$= 5 \times 5 \times 2 \times 3 = 150$

4. 225



$= 5 \times 5 \times 3 \times 3 = 225$

IV Which of the following numbers are divisible by 9?

→ Divisible rule of 9 :- Sum of the digits must be divisible ~~must be~~ by 9.

a. 30,132.
= 3+0+1+3+2 = 9.
= 9 is divisible by 9
∴ 30,132 is divisible by 9

b. 20,772.
= 2+0+7+7+2 = 18
= 18 is divisible by 9.
∴ 20,772 is divisible by 9.

c. 80,301
= 8+0+3+0+1 = 12
= 12 is not divisible by 9
∴ 80,301 is not divisible by 9.

V Which are the following numbers are divisible by 7?

Divisibility rule of 7 :- A number is divisible 7 if the difference between twice the last digits and the number formed by the others digits is either 0 or a multiple of 7.

a. 359
= 9×2 = 18
= 35 − 18
= 17.
∴ 17 is not divisible by 7.

b. 1507
= 2×7 = 14
= 150 − 14
= 136.
∴ 136 is not divisible by 7.

c. b. 7007
= 7×2 = 14
= 700 − 14
= 686
∴ 686 is ~~not~~ divisible by 67.

d. 4079
= ~~407~~ 9×2 = 18
= 407 − 18
= 389
∴ 389 is not divisible by 7.

~~VI~~ VI Check if 82,527 is divisible by 11.

Ans 3 2 5 2 7
| | | | |
0 E 0 E 0

(3+5+7) − [2+2]
15 − 4
= 11 = Diff = 11
∴ 32527 is divisible by 11.

a) 25621

Ans 2 5 6 2 1
| | | | |
0 E 0 E 0
= [2+6+1] − [5+2]
9 − 7
= 2 = Diff = 2
∴ 25621 is not divisible by 11.

5/06/25

Ex :- 2.2

I Which of the following numbers are divisible by 2?

+ Divisibility rule for 2 :- number in ones digit is 0, 2, 4, 6 or 8.

a. 538 :- Number in ones digit is 8 :
∴ 538 is divisible by 2.

b. 298 :- Number in ones digit is 8.
∴ 298 is divisible by 2.

c. 1063 :- Number in ones digit is 3
∴ 1063 is not divisible by 2.

II Which of the following numbers are divisible by 3?

→ Divisibility rule of 3 :- Sum of the digits must be divisible ~~must be divisible~~ by 3.

~~a. 2028~~
a. 219
= 2+1+9 = 12
= 12 is divisible by 3
∴ 219 is divisible by 3.

b. 3159.
= ~~3+5+9~~
= 3+1+5+9 = 18
18 is divisible by 3
∴ 3159 is divisible by 3.

c. 2180
= 2+1+8+0 = 11
= 11 is not divisible by 3.
∴ 2180 is not divisible by 3.

III Which of the following number is divisible by 4?

→ Divisibility rule of 4 :- The number formed by the last 2 digits should be 0 or divisible by 4.

a. 2028 :- Number in ones and tense place is 28.
∴ 2028 is divisible by 4.

b. 85,690 :- Number in ones and tense place is 90.
∴ 85690 is divisible by 4.

c. 37,900 :- Number in ones and tense place is 00
∴ ~~85~~ 37,900 is divisible by 4.

Test of divisibility By	RULE
2	A number is divisible by 2 if its ones digit is 0, 2, 4, 6 or 8,
3	A number divisible by 3 if the sum of its digits is divisible by 3.
4	A number divisible by 4 if its last two digits are 0 or the number formed by them is divisible by 4
5	A number is divisible by 5 if its ones digit is either 5 or 0
6	A number is divisible by 6 if the number is divisible by 2 & 3.
7	A number is divisible by 7 if the difference between twice the last digit & the number formed by the other digits is either 0 or a multiple of 7.

Test of divisibility By	RULE
8	A number is divisible by 8 if the number formed by its last three digits is divisible by 8.
9	A number is divisible by 9 if the sum of its digits is divisible by 9
10	A number is divisible by 10 if the digit at the ones place of the number is 0.
11	A number is divisible by 11 if the difference between the sum of the digits at the odd places and the sum of the digits at the even places is either 0 or a multiple of 11.

c) 15, 10

→ M.O 15 :- 15 (30) 45 60 75 90 105 120 135 150

M.O 10 :- 10 20 (30) 40 50 60 70 80 90 100

LCM :- 30//

4. 16, 12.

→ M.O 16 :- 16 32 48 64 80 (96) 112 128 144 160

M.O 12 :- 12 24 36 48 60 72 84 (96) 108 120

LCM = 96//

IV Fill in the blanks

1. The HCF of 7 and 16 is 1
2. A number is a multiple of each of its factors.
3. The LCM of 10, 15 and 20 is 60
4. The number of factors of 36 is 9
5. 1331 is a multiple of 11.

V Find all the multiples of 11 up to 200

→ 11, 22, 33, 44, 55, 66, 77, 88, 99, 110, 121, 132, 143, 154, 165, 176, 187, 198.

VI Write the next five multiple of 31

⇒ 31 :- 31, 62, 93, 124, 155.

Ex :- 2.1

I Check if first number is a factor of the 2nd number.

a) 9, 45

```
   5
9 ) 45
   -45
    0
```

∴ R = 0

∴ 9 is a factor of 45

b) 4, 48

```
   12
4 ) 48
   -4
    08
    -8
     0
```

∴ R :- 0

∴ 4 is a factor of 48.

c) 15, 60

```
   4
15 ) 60
   -60
    0
```

∴ R - 0

∴ 15 is a factor of 60

d) 13, 42.

```
   3
13 ) 42
   -39
    03
```

∴ R - 3

∴ 13 is not a factor of 42.

IV Which of the following numbers are divisible by 9?

→ Divisible rule of 9 :- Sum of the digits must be divisible ~~must be~~ by 9.

a. 30,1392.
= 3+0+1+3+2 = 9.
= 9 is divisible by 9
∴ 30,132 is divisible by 9

b. 20,772.
= 2+0+7+7+2 = 18
= 18 is divisible by 9.
∴ 20,772 is divisible by 9.

c. 80,301
= 8+0+3+0+1 = 12
= 12 is not divisible by 9
∴ 80,301 is not divisible by 9.

V Which are the following numbers are divisible by 7?

Divisibility rule of 7 :- If number is divisible if the difference between twice the last digits and the number formed by the others digits is either 0 or a multiple of 7.

a. 359
= 9×2 = 18
= 35 - 18
= 17.
∴ 17 is not divisible by 7.

b. 1507
= 2×7 = 14
= 150 - 14
= 136.
∴ 136 is not divisible by 7.

c. b. 7007.
= 7×2 = 14
= 700 - 14
= 686
∴ ~~7~~86 is ~~not~~ divisible by 67.

d. 4079
= ~~40~~7 9×2 = 18
= 407 - 18
= 389
∴ 389 is not divisible by 7.

~~VI~~ VI Check if 82,527 is divisible by 11.

Ans 32527
1 1 1 1 1
O E O E O

(3+5+7) - [2+2]
15 - 4
= 11 = Diff = 11
∴ 32527 is divisible by 11.

a) 25621

Ans 2 5 6 2 1
1 1 1 1 1
O E O E O
= [2+6+1] - [5+2]
9 - 7
= 2 = Diff = 2
∴ 25621 is not divisible by 11.

⇒ PROPERTIES OF FACTORS :

i) Every non-zero number is a factor of itself.
ii) 1 is a factor of every number.
iii) Every non-zero number is a factor of 0.
iv) The factors of a number are finite.

⇒ PROPERTIES OF MULTIPLES :

i) Every number is a multiple of itself.
ii) Every number is a multiple of 1.
iii) The multiples of a number are infinite (unlimited).

⇒ EVEN NUMBER : A number that is a multiple of 2 is called an even number.

⇒ ODD NUMBER : A number that is not a multiple of 2 is called an odd number.

⇒ PRIME NUMBER: A number that is greater than 1 and has exactly two factors (1 and the number itself) is called a prime number.

⇒ COMPOSITE NUMBER : A number that is greater than 1 and has more than two factors is called composite number.

⇒ REMEMBER.

i) 2 is the only even prime number and the smallest one.

ii) Since 1 has only one factor (1), it is neither a prime number nor a composite number.

iii) There are infinite prime and composite numbers.

⇒ TWIN PRIMES : Two prime numbers having a difference of 2 are known a twin primes.

⇒ COPRIMES : Two numbers are said to be coprimes if they have no common factor other than 1.

Exercise : 1.6

I Simplify the following numerical expressions

1. $10 \div 2 + 5 \times 6 - 13$.

⇒ $5 + 5 \times 6 - 13$

$5 + 30 - 13$

$= 35 - 13$

$= 5$

2. $[7 \times 4] + [18 \div 6] - 7$

⇒ $28 + 3 - 7$

$= 31 - 7$

$= 24$.

3. $[39 - 4] \div 7 + 48 \div 2$ of 3

⇒ $35 \div 7 + 48 \div 2$ of 3

$35 \div 7 + 48 \div 2 \times 3$

$= 35 \div 7 + 48 \div 6$

$= 35 + 48 \div 8$

$= 13$.

4. $5 \times [9 \times 3 - 8] + 7 - 16 \div 4$.

⇒ $= 5 \times [27 - 8] + 7 - 16 \div 4$

$= 5 \times 19 + 7 - 16 \div 4$

$= 5 \times 19 + 7 - 4$

$= 95 + 7 - 4$

$= 102 - 4$

$= 98$.

⇒ Numerical expressions may involve different types of brackets ;

→ Vinculam or bar = —

→ Paranthesis or small brackets = ( )

→ Braces or curly brackets = { }

→ Square brackets or Big brackets = [ ]

⇒ $47 - [32 - \{10 - (7 - \overline{5-3})\}]$

$47 - [32 - \{10 - (7 - 2)\}]$

$47 - [32 - \{10 - 5\}]$

$47 - [32 - 5]$

$47 - 27$

$= 20$.

e $(7 \times 5 - 3 \times 8) + [24 \div 8 - 2)$.

$(35 - 24) + (3 - 2]$

$11 + 1$

$= 12_{//}$

b. $54 - [26 - \{12 - 3$ of $4\}]$

$= 54 - [26 - \{12 - 12\}]$

$= 54 - [26 - 0]$

$= 54 - 26$.

$= 28_{//}$

g. $108 + [96 - \{13 + 15 \div 3\}]$

$= 108 + [96 - \{13 + 5\}]$

$= 108 + [96 - 18]$

$= 108 + 78$

$= 186_{//}$

h. $37 + \{15 - (8 + 2) - \overline{6-5}\}$.

$= 37 + \{15 - (8+2) - 1\}$

$= 37 + \{15 - 10 - 1\}$

$= 37 + \{15 - 11\}$

$= 37 + 4$

$= 41_{//}$

i. $124 + [39 - \{18 + 3 - \overline{8-7}\}]$

$= 124 + [39 - \{18 + 3 - 1\}]$

$= 124 + [39 - \{21 - 1\}]$

$= 124 + [39 - 20]$

$= 124 + 19$

$= 143_{//}$

c) 12, 50

$12 \overline{) 50} = 4$, -48, 0 (struck through)

$12 \overline{) 50} = 3$, -36, 05

∴ R - 05

∴ 12 is not a factor of ~~05~~ 50.

II Express each as sum of three odd prime

a) 15 :- 5 + 3 + 7
b) 43 :- 19 + 17 + 3
c) 53 :- 23 + 17 + 13.

III Write all the multiples of .

a. 5 between 30 and 50
⇒ 35, 40, 45

b. 17 between 40 and 90
⇒ 51, 68, 85.

4/6/21

IV Can the product of two primes number be prime? if yes, then give an example.
⇒ 5 × 3 = 15 No.

VI Are 27 and 72 coprimes? Why?
⇒ No, as they have common factors

VI Write all the prime numbers between 65 and 90.
⇒ 67, 71, 73, 79, 83, 89.

VII How many even prime numbers are there in the set of natural numbers? List them.
⇒ Only 1 prime number, that is 2.

VIII Write all the pairs of twin primes less than 20. Also find wheather 49 and 51 are twin primes or not.
⇒ [3,5] [5,7] [11,13] [17,19]
49 and 51 are not twin primes.

IX Write five ~~primes~~ pairs of coprime number.
⇒ [2,3] [3,4] [5,6], [7,8] [11,13]

X Write the multiples of 23 between 80 and 180.
⇒ 92, 115, 138, 161

XI Write two prime numbers less than or equal to the following numbers.

a. 59 ⇒ ~~57~~ 53, 43
b. 101 ⇒ 97, 89
c. 96 ⇒ 83, 73.

=> REMEMBER

i) Prime number that differ by 2 are called twin primes.

ii) Coprimes have only 1 as their common factor

iii) The number 1 is neither prime nor composite.

Ex:- REMEMBER EXERCISE

I Find all the factors of the following

a. 27 :- 1, 3, 9, 27
b. 32:- 1, 2, 4, 8, 16, 32
c. 48:- 1, 2, 6, 4, 8, 12, 48
d. 54:- 1, 2, 3, 6, 9, 54.

II Find the HCF using common factors.

1. a. 12, 16.
=> F.O 12 : 1, 2, 3, (4), 6, 12
F.O 16 : 1, 2, (4), 8, 16. = ~~HCF :~~
= HCF :- 4//

2. 15, 35.
→ F.O 15: 1, 3, (5), 15
F.O 35: 1, (5), 7, 35
= HCF : 5//

3. 27, 54.
→ F.O 27 :- 1, 3, (9), 27
F.O 54 :- 1, 2, 3, 6, (9), 54
HCF = 9//

4. 31, 37.
→ ~~St~~, F.O 31 :- (1), 31
F.O 37 :- (1), 37
HCF :- 1//

III Find the LCM of the following

1. 7, 9
→ M.O 7 : 7 14 21 28 35 42 49 56 (63) 70
M.O 9 : 9 18 27 36 45 54 (63) 72 81 90
LCM = 63//

2. 11, 22.
→ M.O 11 :- 11, (22) 33 44 55 66 77 88 99 110
M.O 22 :- (22) 44 66 88 110 132 154 178 198 220
LCM = 22//

j. $67+9[20-24\div8]$

$= 67+9[4\div8][20-3]$

$= 67+9\times17$

$= 67+153$

$= 220$

K. $\{[24-6)\div3 \text{ of } 2\}+(3+5\div5)$

$= \{18\div3\times2\}+(3+1)$

$= \{18\div6\}+4$

$= 3+4$

$= 7$

2. $\frac{1}{2}$ of $\frac{5}{6}+\frac{3}{4}+\frac{1}{2}-\frac{5}{6}$.

$= \frac{1}{2}\times\frac{5}{6}+\frac{3}{4}+\frac{1}{2}-\frac{5}{6}$.

$= \frac{5}{12}+\frac{3}{4}+\frac{1}{2}-\frac{5}{6}$

$= \frac{5}{12}\times\frac{1}{1}=\frac{5}{12}$.

$= \frac{3}{4}\times\frac{3}{3}=\frac{9}{12}$

$= \frac{1}{2}\times\frac{6}{6}=\frac{6}{12}$

$= \frac{5}{12}+\frac{9}{12}+\frac{6}{12}=\frac{20}{12} \Rightarrow \frac{20}{12}-\frac{5}{6}$.

2	12, 4, 2
2	6, 2, 1
3	3, 1, 1
	1, 1, 1

LCM $= 2\times2\times3 = 12$.

2	12, 6
2	6, 3
3	3, 3
	1, 1

$= \frac{20}{12}\times\frac{1}{1}=\frac{20}{12}$.

$= \frac{5}{6}\times\frac{2}{2}=\frac{10}{12}$

$= \frac{20}{12}-\frac{10}{12}$

$= \frac{10}{12}$

$= \frac{5}{6}$

II Write the next number in each number pattern

a) 9, 10, 12, 15, 19

b) 1, 4, 9, 16, 25

c) 44, 41, 48, 45

d) 2, 4, 12, 48, 240

III Write the next four triangular number in the given pattern

1, 3, 6

P.T.O

= SIGN ROLES

i) − x − = +
ii) − x + = −
iii) + x − = −
iv) + x + = +

⇒ PRACTICE SUMS

a) −5−2
→ −7

b) +4−6
→ −2

c) −2−4
⇒ −6

d) +2+6
⇒ +8

e) −7x−3
→ −21

f) −2x−6x−3
→ −36

g) −4x−3x−1
→ −12

h) −4+3
→ −1

i) −10+22
→ −11

j) +10+81
→ +91

k) −81−21
→ −101

l) −54+32
→ −22

m) −81x+3
→ −243

n) −5x−4x−3
⇒ −60

o) 6x−8−x0
⇒ +48

p) −31−36
→ −67

q) −51x−3x0
→ +153

r) +52+32
⇒ +82

s) −36x−3x−1x1
→ −108

t) −9x−8−6x−5
→ +2156

u) −54+36
⇒ −18

21/4/25

DMAS RULE
↓
Division
↓
Multiplication
↓
Addition
↓
Subtraction

Exercise ⇒ 1.4

I Simplify the following numerical expressions

1. 15−6+10−2
= +25 − 8
= +17

2. 54−17+9
= 54+9−17
= 63−17
= 46

3. 25−6+10+3
= 38 − 6
= 32

4. 25÷5+10−3
= 5+10
= 15−3
= 12

II Write the following numbers ~~as meaningful or meaningless~~ in Hindhu-Arabic numerals

a) LXXXIII : 50+30+3 = 83.
b) XCV :- 90+5 = 95
c) CDLXV :- 400+60+5 = 465
d) MDCLIV :- 1000+600+50+4 = 1654
e) CC XLIX 200+40+9 = 249.

III Classify the following numbers as meaningful or meaningless

a) LVIII :- Meaningful
b) ~~L~~VXVIII :- Meaningless
c) CLXXXX :- Meaningless
d) CCL XIV :- Meaningful
e) MVXV :- Meaningless

IV Give the answer for each of the following in Roman numerals.

a) XIV + XXV
14 + 25
= 39
= XXXIX

b) LXX~~I~~IX + XXI
~~7~~9 + 21
= 100
= C

c) XLV + LXI
45 + 61
= 106
= CVI

SUMMARY

⇒ REMEMBER.

1. Dividend = Divisor × quotient + Remainder.

2. The remainder cannot be greater than the divisor

⇒ In order to avoid ambiguity, and international convention has been accepted.

- if a mathematical expression has symbols of addition and subtraction both, we first add and then subtract.

- if a problem involves multiplication, besides addition and multiplication, we first multiply or divide, and then go addition followed by subtracti

- When a ~~problem~~ involves all the operations, namely, +, −, × and ÷ then there is an agreed formula denoted by 'DMAS', which mathematician follow

Exercise: 1.5.

I Simplify the following numerical expressions.

1. $15 \div 5 + 16 - 6$.
$= 3 + 16 - 6$
$= 19 - 6$
$= 13$

2. $10 \div 2 - 5 + 6 + 2 \times 5$
$= 5 - 5 + 6 + 2 \times 5$
$= 5 - 5 + 6 + 10$
$= 5 - 5 \; 21 - 5$
$= 16$.

3. $51 \times 5 \div 5 - 7 + 9$.
$= 51 \times 1 - 7 + 9$
$= 51 - 7 + 9$
$= 51 + 9$
$= 60 - 7$
$= 53$

4. $80 \times 10 \div 2 + 50 - 7$
$= 80 \times 5 + 50 - 7$
$= 400 + 50 - 7$
$= 450 - 7$
$= 443$

5. $5 \text{ of } 6 \div 10 + 6 - 8$
$= 5 \times 6 \div 10 + 6 - 8$
$= 30 \div 10 + 6 - 8$
$= 3 + 6 - 8$
$= 9 - 8$
$= 1$

6. $27 \div 9 \times 3 + 5 \times 60 \div 30$
$= 3 \times 3 + 5 \times 20$
$= 27 \div 9 \times 3 + 5 \times 60 \div 3 \times 4$
$= 27 \div 9 \times 3 + 5 \times 60 \div 12$
$= 3 \times 3 + 5 \times 5$
$= 9 + 25$
$= 34$

7. $108 + [6 - \{12 + 15 \div 3\}]$
7. $20 \times 5 - 5 \text{ of } 6 + 20 \div 4 - 2 \times 5$
$= 20 \times 5 - 5 \times 6 + 20 \div 4 - 2 \times 5$
$= 20 \times 5 - \overset{30}{5 \times 6} + 20 \div 4 - 2 \times 5$
$= 20 \times 5 - 30 + 5 - 2 \times 5$
$= 100 + 05 - 30 + 5 - 10$
$= 105 - 35 - 10$
$= 105 - 40$
$= 65$.

8. $8 + 66 \div \frac{3}{4} \text{ of } 44 + 9$.
$\Rightarrow 8 + 66 \div \frac{3}{1} \text{ of } \frac{4}{11} + 9$
$= 8 + 66 \div 33 + 9$
$= 8 + 2 + 9$
$= 19$.

9. $7 \times 21 \div \frac{1}{3} \text{ of } 21 + 5 - 3$.
$\Rightarrow 7 \times 21 \div \frac{1}{3} \text{ of } 21^{7} + 5 - 3$
$= 7 \times 21 \div 7 + 5 - 3$
$= 7 \times 3 + 5 - 3$
$= 21 + 5 - 3$
$= 26 - 3$
$= 23$

5. $2 \times 64 \div 8 + 3$
$= 2 \times 8 + 3$
$= 16 + 3$
$= 19$

6. $28 - 5 + 14 - 16$
$= 28 + 14$
$= 42 - 5 - 16$
$= 5 + 16 = 21$
$= 42 - 21$
$= 21$

7. $7 + 3 \times 4 - 3$
$= 7 + 12 - 3$
$= 19 - 3$
$= 16.$

8. $950 - 125 \times 0 + 625 \div 25 - 5 \times 5$
$= 950 - 125 \times 0 + 625 - 5 \times 5$
$= 950 - 0 + 25 - 25$
$= 950 + 25 - 25$
$= 975 - 25$
$= 950 //$

9. $207 + 108 - 127$
$= 315 - 127$
$= 188$

10. ~~$7 - 5 + 3 + 2 \times 9$~~
~~$= 10 + 2 \times 5 \times 9$~~
~~$= 12 - 5 \times 9$~~

10. $7 - 5 + 3 + 2 \times 9$
$= 7 - 5 + 3 + 18$
$= 28 - 5$
$= 23$

11. $28 \div 4 - 7 + 2$
$= 7 - 7 + 2$
$= 9 - 7$
$= 2$

12. $40 \div 5 - 3$
$= 8 - 3$
$= 5$

13. $32 - 45 \div 5 + 3$
$= 32 - 9 + 3$
$= 35 - 9$
$= 26.$

14. $34,217 + 1335 - 28,143$
$= 35,552 - 28,143$
$= 7409.$

15. $645 + 295 - 135 \times 4$
$= 645 + 295 - 540$
$= 940 - 540$
$= 400.$

16. $2880 \div 48 + 160 - 200$
$= 60 + 160 - 200$
$= 220 - 200$
$= 20 //$

17. $128 - 4 \times 21 \div 3 + 1250$
$= 128 - 4 \times 7 + 1250$
$= 128 - 28 + 1250$
$= 128 + 12 - 1278$
$= 1150.$

$= 128 - 4 \times 7 + 1250$
$128 - 28 + 1250$
$1250 + 128 - 28$
$1378 - 28$
$= 1350 //$

128
1378

→ Quantity of sugar sold in 1 day = 19 kg
Quantity of sugar sold in 7 days = 19 × 7
= 133 kg

Total quantity of sugar in shop = 8 3 11 kg
Total quantity of sugar sold − 1 3 3 kg
Left over sugar = 6 9 7 kg

Estimated value to nearest 100s
697 = 700.

SUMMARY

→ Roman Numbers.

- In Roman numbers, there ~~are~~ is no zero (0) and hence no concept of place values.
- In this system, seven basic symbols are used for writting the numerals. These symbols are shown in the table.

Roman Numbers	I	V	X	L	C	D	M
Nos in Indian system	1	5	10	50	100	500	1000

⇒ Here are some rules for writing Roman numerals.

i) I can be subtracted from X and V only.

ii) X can be subtracted from C and M only.

iii) V, L and D can never be subtracted.

iv) C can be subtracted from ~~a symbol of greater value~~ D and M only.

v) A symbol of smaller value can be subtracted from a symbol of greater value just once.

Exercise :- 1.3

I Write the Roman numeral for each of the following

a) 27 → 20+7 → XXVII

b) 272 → 200+70+2 → CCLXXII

c) 64 → 60+4 → LXIV

d) 617 → 600+10+7 → DCXVII

e) 45. → XL+5 → XLV

ⓐ 3655 + 498

∴ Approx value of 3655 in 1000s → 4000

Approx value of 498 in 100s → 500

4000

+ 500

= 4500

ⓑ 2894 + 6873 + 1350

∴ Approx value of 2894 in 1000s → 3000

Approx value of 6873 in 1000s → +7000

Approx value of 1350 in 1000s → 1000

= 11,000

ⓒ 7006 − 3844

∴ Approx value of 7006 in 1000s → 7000

Approx value of 3844 in 1000s → − 4000

= 3000

ⓓ 37 × 62

∴ Approx value of 37 in 10s → 40

Approx value of 62 in 10s → × 60

00

2400+

2400

= 2400.

ⓔ 513 × 43

∴ Approx value of 513 in 100s → 500

Approx value of 43 in 10s → × 40

000

2000+

= 20,000.

⑤ There are 2178 red beads and 3198 green beads in a bag. estimate the total nos of beads in both the ~~bags~~ bags to the nearest hundreds.

→ No. of red beads = 2178

No of green beads = + 3198

∴ 5376. 5376

Convert to Estimated value to nearest 100s

= 5400.

⑥ A shopkeeper has 831 kg of sugar. He sells 19 kg of sugar everyday. How much sugar is left after seven days of sales? Estimate the difference to nearest 100s.

PTO

II Round off to nearest 10,000's

a) 85,856 → 90,000
b) 89,132 → 90,000
c) 143,719 → 1,40,000

III Round off to nearest lakh

a) 4,65,263 → 5,00,000
b) 7,51,314 → 8,00,000
c) 23,64,952 → 24,00,000

IV Estimate the difference between 56,733 and 62,542 by rounding the nos to nearest thousand and compare the difference with actual difference

→ actual value ⟷ Estimated value to 1000's

actual value		Estimated value
62542	⟷	63,000
-56733		- 57,000

② Estimate the difference numbers to nearest 10's and find quotient

a) 82 ÷ 24

Estimated to nearest 10's

82 → 80   24 ⇒ 20

ESTIMATED VALUE.

20) 80 (4
-80
0

∴ The quotient is 4

b) 362 ÷ 61.

362 → 360
61 → 60

60) 360 (6
-360
0
= 6.

③ Estimate the sum to nearest thousand

a) 22,918 + 29,103 + 11,038.

Actual value		Estimated sum to nearest 1000's
22,918	⟷	23,000
+29,103		+29,000
11,038		11,000
63,059		63,000

④ Find the approximate value in thousands or, hundreds or tens for the following

P.T.O

PLACE VALUE:- The place value of a digit of a number depends upon its position in the number.

FACE VALUE:- The face value of a digit does not depend on its position in the number. It always remains the same regardless of the place it occupies in the number.

PREDECESSOR:- The predecessor of a given number is that preceeds it i.e the number.

SUCCESSOR:- The successor of a given number is the number that succeeds it, i.e the number just after the given number.

Exercise :- 1.1

I Write the following numbers in words Indian form.

① 29,37,112 :- Twenty nine lakh Thirty seven thousand and one hundred and Twelve.

② 3,55,33,555 :- Three crores fifty five lakhs Thirty three thousand five hundred and fifty five.

③ 89,05,339 :- Eighty nine lakhs five thousand Three hundred and thirty nine.

II Write the following numbers in words International word.

① 127,946 = One hundred twenty seven thousand nine hundred and forty six.

② 6,845,121 = six million eight hundred forty five thousand one hundred and twenty one.

07/04/25

CH:- 1: KNOWING OUR NUMBERS.

⇒ Indian Place Value Chart

TCrores	Crores	TLakh	Lakh	TThousan-d	Thousa-nd	Hundr-eds	Tens	Ones

⇒ International Place Value Chart

i) Ones
ii) Tens
iii) Hundreds
iv) Thousands
v) Ten Thousands
vi) Hundred Thousands
vii) One billion
viii) Ten billion
IX) Hundred billion.

ASCENDING ORDER :- When numbers are written from the smallest to largest number they are in ascending order..

DESCENDING ORDER :- When numbers are written from largest to smallest they are in descending order.

VIII Write the predecessor of the given nos.

a) 60,000 :- 50,999
b) 41,200 :- 41,199
c) 3,21,908 :- 3,21,907
d) 20,00,000 :- ~~20,00~~, ~~10,00,00~~ 10,99,999.

IX Write the next two numbers in the given pattern

a) 16,45,938, 17,45,938, 18,45,938 19,45,938 20,45,938.
b) 44,61,201, 44,63,301, 44,65,401. 44,67,501 44,69,601.

X Circle the largest nos and underline the smallest nos

a) 29,34,016, 8,93,513, (2,95,37,218), 18,57,009.
b) 8,91,009, (52,34,333) 21,92,766, 8,14,345.

XI Form the greatest and smallest digit number using the given digit only once

a) 5,6,9,1,2,4,3 :- 1234569.
b) 3,0,2,9,5,7,8 :- 2035789.

XII Find the difference between place value of 5 and 2 in 6,35,42,817

P.V of 5 = 500000
P.V of 2 = 2000

$\Rightarrow$ 500000 − 2000 = 498000

Estimation

~~DEFE~~ DEFINATION :- Estimation only gives the approximate value, that is a value which is close to the actual value.

Exercise :- 1.2

I Round off to the nearest thousands

a) 5914
→ 5914 (+1)
= 6000

b) 4164
→ 4164
= 4000

c) 1936.
→ 1936 (+1)
= 2000.

c) 15,415,293 = Fifteen billion four hundred fifteen thousand two hundred ninety three.

III Write the following in expanded form.

a) 6,74,291 :- 6x1,00,000 + 7x 10,000 + 4x 1000 + 2x100 + 9x10 + 1x1
6,00,000 + 70,000 + 4000 + 200 + 90 + 1

b) 30,85,921 :- 3x10,00,000 + 0x1,00,000 + 8x 10,000 + 5x1000 + 9x100 + 2x10 + 1x1
30,00,000 + 0 + 80,000 + 5000 + 900 + 20 + 1

c) ~~8,0,0~~ 8,01,03,045 :-

IV Write the numerals for the following

1) Twenty six crore fourteen lakh fifty two :- 26,14,00,052

2) Seventy six lakh two hundred nine :- 76,00,209.

3) Five crore eighty seven lakh and twenty :- 5,87,00,020

V Write the following numbers in standard form.

a) 5,00,000 + 60,000 + 2000 + 60 + 9 - 5,62,069.

b) 30,000 + 7,000 + 300 + 20 + 7 - 37,327

c) 9,00,00,000 + 1000 + 3 - 9,00,01,003

d) 8,00,00,000 + 90,00,000 + 7000 + 200 + 8 - 8,90,07,208

VI Compare the numbers using >, < or =

a) 4,85,90,216 > 48,59,021
b) 39,47,306 < 3,94,73,600.

VII Write the successor of the given nos.

a) 27,30,899 :- 27,30,900
b) 99,999 :- 1,00,000
c) 3,57,619 :- 3,57,620
d) 20,00,000 :- 20,00,001.