

Chapter No. 3

Playing with Numbers

Factor: A factor of a Number is an exact divisor of that Number.

Example

Find factors of 6

sol factors of 6 = $1 \times 6 = 6$
 $2 \times 3 = 6$
 $3 \times 2 = 6$
 $6 \times 1 = 6$

\therefore factors of 6 = 1, 2, 3, 6

27 | 07 | 27

Exercise 3.1

1. I write all factors of the following Numbers

(a) 24

sol factors of 24 = $1 \times 24 = 24$
 $2 \times 12 = 24$
 $3 \times 8 = 24$
 $4 \times 6 = 24$
 $6 \times 4 = 24$
 $8 \times 3 = 24$
 $12 \times 2 = 24$
 $24 \times 1 = 24$

\therefore factors of 24 = 1, 2, 3, 4, 6, 8, 12, 24

(b) 15

sol factors of 15 = $1 \times 15 = 15$
 $3 \times 5 = 15$
 $5 \times 3 = 15$
 $15 \times 1 = 15$

\therefore factors of 15 = 1, 3, 5, 15

(c) 21

sol factors of 21 = $1 \times 21 = 21$
 $3 \times 7 = 21$
 $7 \times 3 = 21$
 $21 \times 1 = 21$

factors of 21 = 1, 3, 7, 21

Qb 27

sol

factors of 27: $1 \times 27 = 27$

$$3 \times 9 = 27$$

$$9 \times 3 = 27$$

$$27 \times 1 = 27$$

\therefore factors of 27: 1, 3, 9, 27

Qb 12

sol

factors of 12: $1 \times 12 = 12$

$$2 \times 6 = 12$$

$$3 \times 4 = 12$$

$$4 \times 3 = 12$$

$$6 \times 2 = 12$$

$$12 \times 1 = 12$$

\therefore factors of 12: 1, 2, 3, 4, 6, 12

Qb 20

sol

factors of 20: $1 \times 20 = 20$

$$2 \times 10 = 20$$

$$4 \times 5 = 20$$

$$5 \times 4 = 20$$

$$10 \times 2 = 20$$

$$20 \times 1 = 20$$

\therefore factors of 20: 1, 2, 4, 5, 10, 20

Qb 18

sol

factors of 18: $1 \times 18 = 18$

$$2 \times 9 = 18$$

$$3 \times 6 = 18$$

$$6 \times 3 = 18$$

$$9 \times 2 = 18$$

$$18 \times 1 = 18$$

\therefore factors of 18: 1, 2, 3, 6, 9, 18

Qb 23

sol

factors of 23: $1 \times 23 = 23$

$$23 \times 1 = 23$$

\therefore factors of 23: 1, 23

(i) 36

sol factors of 36:

$$\begin{aligned} 1 \times 36 &= 36 \\ 2 \times 18 &= 36 \\ 3 \times 12 &= 36 \\ 4 \times 9 &= 36 \\ 6 \times 6 &= 36 \\ 9 \times 4 &= 36 \\ 12 \times 3 &= 36 \\ 18 \times 2 &= 36 \\ 36 \times 1 &= 36 \end{aligned}$$

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

2. ✕ write first five multiples of:

(a) 5

sol multiples of 5 =

$$\begin{aligned} 5 \times 1 &= 5 \\ 5 \times 2 &= 10 \\ 5 \times 3 &= 15 \\ 5 \times 4 &= 20 \\ 5 \times 5 &= 25 \end{aligned}$$

\therefore first five multiples of 5: 5, 10, 15, 20, 25

(b) 8

sol multiples of 8 =

$$\begin{aligned} 8 \times 1 &= 8 \\ 8 \times 2 &= 16 \\ 8 \times 3 &= 24 \\ 8 \times 4 &= 32 \\ 8 \times 5 &= 40 \end{aligned}$$

\therefore first five multiples of 8 = 8, 16, 24, 32, 40

(c) 9

sol multiples of 9 =

$$\begin{aligned} 9 \times 1 &= 9 \\ 9 \times 2 &= 18 \\ 9 \times 3 &= 27 \\ 9 \times 4 &= 36 \\ 9 \times 5 &= 45 \end{aligned}$$

\therefore first five multiples of 9 = 9, 18, 27, 36, 45.

3. ^{III} Match the items in column 1 with the items in column 2.

Column 1

Column 2

- | | |
|----------|-------------------|
| (i) 35 | a) multiple of 8 |
| (ii) 15 | b) multiple of 7 |
| (iii) 16 | c) multiple of 70 |
| (iv) 20 | d) factor of 30 |
| (v) 25 | e) factor of 50 |
| | f) factor of 20 |

Sol

- (i) → b
(ii) → d
(iii) → a
(iv) → f
(v) → e

Note:

① 1 is a factor of every Number

Example

⑤

$1 \times 5 = 5$

factor

② Every Number is a factor of itself

Example

⑦

$1 \times 7 = 7$

$7 \times 1 = 7$

Itself

③ Every factor of a Number is an exact divisor of that Number

④ Every factor is less than or equal to the given number

⑤ Number of factors of a given number are finite

(6) Every multiple of a number is greater than or equal to that Number.

(7) The number of multiples of given number is infinite.

(8) Every Number is a multiple of itself.

Prime Numbers:

The number having only two factors, these numbers are called prime numbers.

Namly factors are 1 and it self.

Example of prime numbers below 20: 2, 3, 5, 7, 11, 13, 17, 19

Composite Numbers:

The number having more than two factors, these Numbers are called composite Numbers.

Examples: 4, 6, 8, 9, 10, 12, 14, 15, 16, 18, 20, ...

Note: 1 is neither a prime number nor composite number.

Even Numbers:

If A number exact divisible by 2, these numbers are called Even Numbers.

(OR)

Multiples of 2, these Numbers are called even numbers.

Examples: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, ...

Note: 2 is a Even prime number.

Verd
01/8/24

Odd Numbers:

If a Number not divisible by 2, then these Numbers are called odd Numbers.

Example: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, ---

Exercise 3.2

Q What is the Sum of any two (a) Odd Numbers? (b) Even Numbers?

Q Sol // Given two odd Numbers = $7+1=8$ = even Number
 $3+5=8$ = even Number
 $9+13=22$ = even Number

∴ Sum of any two odd Numbers is even numbers.

~~Q State whether the following statements are true or false:~~

Q Sol // Given two even numbers: $4+8=12$
 $6+10=16$
 $26+30=56$

∴ Sum of any two Even Numbers is Even Numbers.

~~Q Sol~~
~~Q Sol~~
~~Q Sol~~

4) Write down Separately the prime and composite numbers less than 20.

sol/ prime Numbers of Less than 20 : 2, 3, 5, 7, 11, 13, 17, 19

Composite Numbers of Less than 20 = 4, 6, 8, 9, 10, 12, 14, 15, 16, 18

5) What is the greatest prime number between 1 and 10?

sol/

Between the prime Number 1 and 10 = 2, 3, 5, 7

∴ greatest prime Number = 7

8) Which of the following numbers are prime? (a)

(a) 23 (b) 51 (c) 37 (d) 26

∴ prime Numbers = 23, 37.

6) Express the following as the Sum of two odd primes.

(a) 44

sol/ Sum of two odd primes = $7 + 37 = 44$

(b) 36

sol/ Sum of two odd primes = $13 + 23 = 36$

(c) 24

sol/ Sum of two odd primes = $11 + 13 = 24$
 $= 24$

(d) 18

sol/ Sum of two odd prime Numbers = $7 + 11 = 18$
 $= 18$

10) Express each of the following numbers as the Sum of three odd primes:

(a) 21

sol/ Sum of three odd primes = $3 + 7 + 11 = 21$

(b) 31

Sum of three odd primes = $3 + 5 + 23 = 31$

(c) 53

Sum of three odd primes = $23 + 17 + 13$

(d) 61

Sum of three odd primes = $37 + 11 + 13 = 61$

(12) Fill in the blanks:

(a) A number which has only two factors is called prime Number

(b) A number which has more than two factors is called a Composite Number

(c) 1 is neither prime nor composite Number

(d) The Smallest prime Number is 2

(e) The Smallest composite Number is 4

(f) The Smallest even Number is 2

(11) Write five pairs of prime numbers less than 20 whose Sum is divisible by 5.

(Hint: $3 + 7 = 10$)

(i) $7 + 13 = 20$

(ii) $13 + 17 = 30$

(iii) $2 + 3 = 5$

(iv) $2 + 13 = 15$

(v) $11 + 19 = 30$

Note: Greek Mathematician Eratosthenes, in the third century B.C. Let us see the method. List all numbers from 1 to 100, as shown below

Eratosthenes method

~~1~~ 2 3 4 5 6 7 8 9 10
~~11~~ 12 13 14 15 16 17 18 19 20
~~21~~ 22 23 24 25 26 27 28 29 30
~~31~~ 32 33 34 35 36 37 38 39 40
~~41~~ 42 43 44 45 46 47 48
~~51~~ 52 53 54
~~61~~ 62 63 55
~~71~~ 72 73
~~81~~ 82 83
~~91~~ 92 88

X	2	3	4	5	X	7	8	X	10
11	X	13	X	15	X	17	X	19	20
21	X	23	X	25	X	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Prime Numbers below 100:-

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37

41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97

* How many prime numbers below 100?

Ans

25

Q Write Seven consecutive composite numbers less than 100 so that there is no prime number between them.

90, 91, 92, 93, 94, 95, 96.

⑤ The numbers 13 and 31 are prime numbers. Both these numbers have same digits 1 and 3. Find such pairs of prime numbers upto 100.

Sol

17, 71 37, 73 79, 97 13, 31

Twin prime Numbers:-

Two prime Number whose difference is 2 are called twin primes.

1) Give three pairs of prime numbers whose difference is 2.

Sol

Twin primes = 3, 5 5, 7 11, 13 41, 43 71, 73

2) State whether the following statements are true or false:

- (a) The sum of three odd numbers is even (false)
- (b) The sum of two odd numbers and one even number is even (true)
- (c) The product of three odd numbers is odd (true)
- (d) If an even number is divided by 2, the quotient is always odd (false)
- (e) All prime numbers are odd (false)
- (f) prime numbers do not have any factors (false)
- (g) Sum of two prime numbers is always even (true)
- (h) 2 is the only even prime number (true)
- (i) All even numbers are composite numbers (false)
- (j) The product of two even numbers is always even (true)

Tests for Divisibility of Numbers:

Tests of divisibility by 2

A Number is divisible by 2 if it has any of the digits 0, 2, 4, 6, 8 in its ones place

Examples:-

8100, 8942, 8944, 8966, 98868

The above examples are exactly divisible by 2. So that ones place is 0, 2, 4, 6, 8

Test of divisibility by "3" If the Sum of the digits is a multiple of 3, then the Number is divisible by 3.

Example:- 7,221

$$\text{Sum of digits} = 7 + 2 + 2 + 1 = 12$$

$$= 12$$
$$= 12 \text{ is divisible by 3}$$

\therefore So Given number 7,221 is divisible by 3.