

## Chapter - 3

### Playing with Numbers

1. **Factors**  $\Rightarrow$  A number which divides a given number completely and leaves no remainder is called the factor of given number.
- $\Rightarrow$  1 is a factor of every number.
- $\Rightarrow$  Every no except 1 is a factor of itself.

2. **Multiples**  $\Rightarrow$  Multiples of a number are what we get after multiplying the number with a natural number.

3. **Whole Number** :- Any of the numbers 0, 1, 2, 3 etc. There no fractional or decimal part and no negatives.

#### Whole Numbers by different Names

- (i) **Prime Numbers** :- All the numbers which have only two factors, 1 and the number itself are called the prime numbers.  
ex. 2, 3, 5, 7.
- (ii) **Composite Numbers** :- All the numbers which have more than two factors are called composite numbers.  
ex. 4, 6, 8, 10.

(iii) Even Numbers :- All the numbers that are multiples of 2 are called even number.  
Ex:- 2, 4, 6 etc.

(iv) Odd Numbers :- All the numbers that are not multiples of 2 or a number that does not have 2 as its factor is called an even no. Ex:- 1, 3, 5, 7 etc.

(v) Co-prime Numbers :- A pair of 2 no. which have no common factor other than 1 are called co-prime.  
Ex. (2, 3) (3, 4)

(vi) Twin-Primes :- A set of 3 prime numbers differing by 2 are called twin primes.  
Ex. (3, 5), (5, 7)

(vii) Prime Triplet :- A set of 3 prime numbers differing by 2 form a prime triplet.  
Ex. (3, 5, 7)

(viii) Perfect Numbers :- If sum of all the factors of a number is double that number, then that number is called a perfect number.

Exercise 3.1

Q1. Write all the factors of the following numbers

(a) 24

$$\begin{aligned} 1 \times 24 &= 24 \\ 2 \times 12 &= 24 \\ 3 \times 8 &= 24 \\ 4 \times 6 &= 24 \\ 6 \times 4 &= 24 \\ 8 \times 3 &= 24 \\ 12 \times 2 &= 24 \\ 24 \times 1 &= 24 \end{aligned}$$

(b) 15

$$\begin{aligned} 1 \times 15 &= 15 \\ 3 \times 5 &= 15 \\ 5 \times 3 &= 15 \\ 15 \times 1 &= 15 \end{aligned}$$

Factor of 15  $\Rightarrow$  1, 3, 5, 15

Factor of 24  $\Rightarrow$  1, 2, 3, 4, 6, 8, 12, 24

(c) 21

$$\begin{aligned} 1 \times 21 &= 21 \\ 3 \times 7 &= 21 \\ 7 \times 3 &= 21 \\ 21 \times 1 &= 21 \end{aligned}$$

(d) 27

$$\begin{aligned} 1 \times 27 &= 27 \\ 3 \times 9 &= 27 \\ 9 \times 3 &= 27 \\ 27 \times 1 &= 27 \end{aligned}$$

Factor of 21 = 1, 3, 7 and 21

Factor of 27 = 1, 3, 9 and 27

(e) 12

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

Factor of 12 = 1, 2, 3, 4, 6 and 12

(f) 20

$1 \times 20 = 20$

$2 \times 10 = 20$

$4 \times 5 = 20$

$5 \times 4 = 20$

$10 \times 2 = 20$

$20 \times 1 = 20$

Factor of 20 = 1, 2, 4, 5, 10 and 20

(g)

18

$1 \times 18 = 18$

$2 \times 9 = 18$

$3 \times 6 = 18$

$6 \times 3 = 18$

$9 \times 2 = 18$

$18 \times 1 = 18$

Factor of 18 = 1, 2, 3, 6, 9 and 18.

(h) 23

$1 \times 23 = 23$

$23 \times 1 = 23$

Factor = 1 and 23.

Q2. Write first five multiples of

(a) 5

$5 \times 1 = 5$

$5 \times 2 = 10$

$5 \times 3 = 15$

$5 \times 4 = 20$

$5 \times 5 = 25$

(b)

8

$8 \times 1 = 8$

$8 \times 2 = 16$

$8 \times 3 = 24$

$8 \times 4 = 32$

$8 \times 5 = 40$

(c) 9

$9 \times 1 = 9$

$9 \times 2 = 18$

$9 \times 3 = 27$

$9 \times 4 = 36$

$9 \times 5 = 45$

### Exercise 3.1

Match the items in Column 1 with the items in Column 2.

Column 1

- 35 (b)
- 15 (d)
- 16 (a)
- 20 (f)
- 25 (e)

Column 2

- (a) Multiple of 8
- (b) Multiple of 7
- (c) Multiple of 70
- (d) Factor of 30
- (e) Factor of 50
- (f) Factor of 20

Q4. Find all the Multiples of 9 up to 100.

- Ans
- $9 \times 1 = 9$
  - $9 \times 2 = 18$
  - $9 \times 3 = 27$
  - $9 \times 4 = 36$
  - $9 \times 5 = 45$
  - $9 \times 6 = 54$
  - $9 \times 7 = 63$
  - $9 \times 8 = 72$
  - $9 \times 9 = 81$
  - $9 \times 10 = 90$
  - $9 \times 11 = 99$

Multiples of 9  $\Rightarrow$  9, 18, 27, 36, 45, 54, 63, 72, 81, 90, 99.

Exercise 3.2

Q1. What is the sum of any two!

(a) odd numbers? (b) even number?

(a) odd numbers  $\Rightarrow 3 + 5 \Rightarrow 8$   
 $\Rightarrow 15 + 13 \Rightarrow 28$

The sum of any two odd numbers is even number.

(b) even numbers  $\Rightarrow 2 + 4 = 6$   
 $8 + 6 = 14$

The sum of any two even numbers is even number.

Q2. State whether the following statements are True or False:-

(a) The sum of three odd numbers is even. (False)  
 Ex:  $7 + 9 + 3 \Rightarrow 19$

(b) The sum of two odd numbers and one even number is even. (True)

Ex  $\Rightarrow 3 + 5 + 2 \Rightarrow 10$

(c) The product of three odd numbers is odd. (True)

Ex  $\Rightarrow 3 \times 7 \times 9 \Rightarrow 189$

(d) If an even number is divided by 2, the quotient is always odd. (false)

ex  $\Rightarrow 8 \div 2 = 4$

(e) All prime numbers are not odd. (false)

ex  $\rightarrow 2$  is prime number but it is also an even number.

(f) Prime number do not have any factors. (false)

ex  $\rightarrow 1$  and the number itself are factors of the number.

(g) Sum of two prime numbers is always even. (false)

ex  $\rightarrow 2 + 5 \Rightarrow 7$  odd no.

(h) 2 is the only even prime number. (True)

ex 2 is the only even prime number.

(i) All even numbers are composite number (false)

ex Since, 2 is a prime number.

(j) The product of two even numbers is always even. (True)

ex  $2 \times 4 = 8$  even number.

Q3. The numbers 13 and 31 are prime numbers. Both these numbers have same digits 1 and 3. Find such pairs of prime numbers up to 100.

Ans. The prime numbers with same digits upto 100 are as follows:-

17 and 71

37 and 73

79 and 97

Q4. Write down separately the prime and composite numbers less than 20.

Ans. 2, 3, 5, 7, 11, 13, 17 and 19 are the prime numbers less than 20.

4, 6, 8, 9, 10, 12, 14, 15, 16 and 18 are the composite numbers less than 20.

Q5. What is the greatest prime number between 1 to 10?

Ans. 2, 3, 5 and 7 are the prime numbers between 1 to 10, 7 is the greatest prime number among them.



Exercise 3.2

Q6. Express the following as the sum of two odd numbers / prime :-

$$(a) 44 \Rightarrow 3 + 41$$

$$(b) 36 \Rightarrow \boxed{3 + 33} \quad 5 + 31$$

$$(c) 24 \Rightarrow \boxed{3 + 21} \quad 5 + 19$$

$$(d) 18 \Rightarrow 5 + 13$$

Q7. Give three pairs of the prime numbers whose difference is 2.

$$(i) 5 \text{ and } 3 \quad 5 - 3 = 2$$

$$(ii) 7 \text{ and } 5 \quad 7 - 5 = 2$$

$$(iii) 13 \text{ and } 11 \quad 13 - 11 = 2$$

Q8. Which of the following numbers are prime?

$$(a) 23$$

$$1 \times 23 = 23$$

$$23 \times 1 = 23$$

23 has only two factors 1 and 23. Hence it is a prime number.

$$(b) 51$$

$$1 \times 51 = 51$$

$$17 \times 3 = 51$$

$$51 \times 1 = 51$$

51 is not a prime number.

(c) 37

$$1 \times 37 = 37$$

$$37 \times 1 = 37$$

37 has only two factors 1 and 37. So it is a prime number.

(d) 26

$$1 \times 26 = 26$$

$$13 \times 2 = 26$$

$$26 \times 1 = 26$$

26 is not a prime number.

Q9. Write seven consecutive composite numbers less than 100 so that there is no prime number between them.

Ans

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

are seven consecutive composite numbers.

Prime Numbers

2 29 67

3 31 71

5 37 73

7 41 79

11 43 83

13 47 97

17 53

19 59

23 61

Q10. Express each of the following numbers as the sum of 3 odd primes.

(a) 21  $\Rightarrow$  3 + 5 + 13

(b) 31  $\Rightarrow$  3 + 5 + 23

(c) 53  $\Rightarrow$  13 + 17 + 23

(d) 61  $\Rightarrow$  7 + 13 + 41

Q11. Write 5 pairs of prime numbers less than 20 whose sum is divisible by 5.

Ans (i) 2 + 3 = 5

(ii) 2 + 13 = 15

(iii) 3 + 17 = 20

(iv) 7 + 13 = 20

(v) 19 + 11 = 30

Q12. Fill in the blanks:-

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

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

(c) 1 is neither prime no. nor Composite number.

(d) The smallest prime number is 2.

(e) The smallest Composite number is 4.

(f) The smallest even number is 2.

### Exercise 3.3

Q2. Using divisibility test, determine which of the following numbers are divisible by 4 and 8

(a) 572

The last two digits of given no. is 72, which is divisible by 4.

$$\begin{array}{r} 18 \\ 4 \overline{) 72} \\ \underline{- 4} \phantom{2} \\ 32 \\ \underline{- 32} \\ 0 \end{array}$$

So 572 is divisible by 4.

The last 3 digits are 572.  
Let us divide by 8.

$$\begin{array}{r} 71 \\ 8 \overline{) 572} \\ \underline{- 56} \phantom{2} \\ 12 \\ \underline{- 8} \\ 4R \end{array}$$

So 572 is not divisible by 8.

(b) 726352

Ans. The last two digits of given no. is 52.  
Let us divide by 4.

$$\begin{array}{r} 13 \\ 4 \overline{) 52} \\ \underline{-4} \downarrow \\ 12 \\ \underline{-12} \\ 0 \end{array}$$

So 726352 is divisible by 4.

The last 3 digits are 352.  
Let us divide by 8.

$$\begin{array}{r} 44 \\ 8 \overline{) 352} \\ \underline{-32} \downarrow \\ 32 \\ \underline{-32} \\ 0 \end{array}$$

So 726352 is divisible by 8.

(c) 5500

Ans 5500 is divisible by 4.

The last three digits of given no  $\Rightarrow$  500  
Let us divide by 8.

$$\begin{array}{r} 62 \\ 8 \overline{) 500} \\ \underline{- 48} \phantom{0} \\ 20 \\ \underline{- 16} \\ 4R \end{array}$$

So 5500 is not divisible by 8.

(d) 6000

Ans 6000 is divisible by 4. because last 2 digits are 00.  
6000 is divisible by 8. because last three digits are 000.

(e) 12159

The last 2 digits are 59.

So let us divide by 4.

So 12159 is not divisible by 4.

$$\begin{array}{r} 14 \\ 4 \overline{) 59} \\ \underline{- 4} \phantom{0} \\ 19 \\ \underline{- 16} \\ 3R \end{array}$$

The last 3 digits of given no  $\Rightarrow$  159  
Let us divide by 8.

$$\begin{array}{r}
 19 \\
 8 \overline{) 159} \\
 \underline{- 81} \\
 79 \\
 \underline{- 72} \\
 \underline{\quad 6R}
 \end{array}$$

So 12159 is not divisible by 8.

(f) 14560

As The last two digits of given no = 60  
Let us divide by 4.

$$\begin{array}{r}
 15 \\
 4 \overline{) 60} \\
 \underline{- 41} \\
 20 \\
 \underline{- 20} \\
 \underline{\quad 0}
 \end{array}$$

So 14560 is divisible by 4.

The last three digits of given no = 560  
Let us divide by 8.

$$\begin{array}{r}
 70 \\
 8 \overline{) 560} \\
 \underline{- 561} \\
 \underline{\quad 00}
 \end{array}$$

So 14560 is divisible by 8.



~~(f)~~ 14'  
(g) 21084

The last 2 digits of given no = 84  
Let us divide by 4.

$$\begin{array}{r} 4 \overline{) 84} \\ - 8 \downarrow \\ \hline 04 \\ - 4 \\ \hline 0 \end{array}$$

So 21084 is divisible by 4.

The last 3 digits of given no = 084  
Let us divide by 8.

So 21084 is not divisible by 8.  
 $8 \overline{) 084}$

$$\begin{array}{r} 01 \\ 8 \overline{) 084} \\ - 8 \downarrow \\ \hline 04 \end{array}$$

(h) 31795072

The last 2 digits of given no = 72  
Let us divide by 4.

$$\begin{array}{r} 18 \\ 4 \overline{) 72} \\ - 4 \downarrow \\ \hline 32 \\ - 32 \\ \hline 0 \end{array}$$

So 31795072 is divisible by 4.

The last 3 digits of given no = 072  
Let us divide by 8.  $72 \div 8 = 9$

So 31795072 is divisible by 8.

(i) 1700

As 1700 is divisible by 4, because last two digits is 00.

The 3 digits of given no = 700  
Let us divide by 8

$$\begin{array}{r}
 87 \\
 8 \overline{) 700} \\
 \underline{- 64} \phantom{0} \\
 60 \\
 \underline{- 56} \\
 4R
 \end{array}$$

So 1700 is not divisible by 8.

(j) 2150

The last two digits of given no  $\Rightarrow$  50  
Let us divide by 4.

$$\begin{array}{r}
 12 \\
 4 \overline{) 50} \\
 \underline{- 4} \phantom{0} \\
 10 \\
 \underline{- 8} \\
 2R
 \end{array}$$

So, 2150 is not divisible by 4.

The last 3 digits of given no  $\Rightarrow$  150  
Let us divide by 8.

$$\begin{array}{r}
 18 \\
 8 \overline{) 150} \\
 \underline{- 8} \phantom{0} \\
 70 \\
 \underline{- 64} \\
 6R
 \end{array}$$

So 2150 is not divisible by 8.

Q3. Using divisibility test, determine which of the following numbers are divisible by 6:-

$$\text{Factor of } 6 = 2 \times 3$$

(a) 297144

As last digit of the number is 4. Hence, the no is divisible by 2.

By adding all the digits of the no.  $2 + 9 + 7 + 1 + 4 + 4 \Rightarrow 27$ . We get 27 which is divisible by 3.

So the no is divisible by 3.

The number is divisible by both 2 and 3 so the number is divisible by 6.

(b) 1258

Last digit of the no is 8. Hence, the no. is divisible by 2.

By adding all the digit of the no  $\Rightarrow 1 + 2 + 5 + 8 = 16$  we get 16 which is not divisible by 3. So the no is not divisible by 3.

The no is divisible by 2 but not by 3. So the no. is not divisible by 6.

(c) 4335

Last digit of the no is 5. Hence, the no is not divisible by 2.

By adding all the digit of the no  $= 4 + 3 + 3 + 5 = 15$  we get 15 which is divisible by 3. So the no is divisible by 3.

The no is not divisible by 2 but by 3. So the no is not divisible by 6.

(d) 61233

Ans last digit of the number is 3, so the no is not divisible by 2.

By adding all the digit of the no  $6+1+2+3+3=15$  we get 15, which is divisible by 3.

The no. is divisible by 3 but not by 2, so the no. is not divisible by 6.

(e) 901352

Ans last digit of the no. is 2, so the no is divisible by 2.

By adding all the digit of the no  $9+0+1+3+5+2=20$  we get 20 which is not divisible by 3.

The no. is divisible by 2 but not by 3, so the number is not divisible by 6.

(f) 438750

Ans last digit of the no is 0, so the no. is divisible by 2.

By adding all the digit of the no  $4+3+8+7+5+0=27$  we get 27 which is divisible by 3.

The no. is divisible by 2 and 3, so the number is divisible by 6.

(g) 1790184

Ans last digit of the no. is 4, so the no. is divisible by 2.

By adding all the digit of the no  $1+7+9+0+1+8+4=30$  we get 30 which is divisible by 3.

The no. is divisible by 2 and 3, so the number is divisible by 6.

(h) 12583

Ans last digit of the number is 3. Hence it is not divisible by 2.

By adding all the digit  $1+2+5+8+3=19$ . we get 19 which is not divisible by 3.

The no. is not divisible by 2 & 3. So the number is not divisible by ~~2~~ 6.

(i) 639210

Ans last digit of the no is 0. Hence it is ~~not~~ divisible by 2.

By adding all the digit  $6+3+9+2+1+0=21$ . we get 21. which is divisible by 3.

The number is divisible by both 2 & 3. So the number is divisible by 6.

(j) 17852

Ans last digit of the no. is 2. Hence it is divisible by 2.

By adding all the digit  $1+7+8+5+2=23$ . we get 23 which is not divisible by 3.

The no. is divisible by 2 but not by 3. So the number is not divisible by 6.