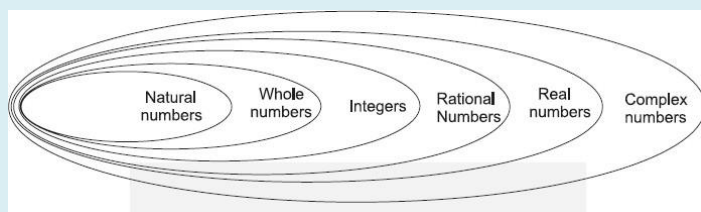


## NUMBERS

### Concepts

#### Numbers classification



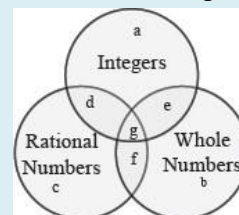
- **Factors** - Factors of a number are the numbers which will divide the given number without leaving any remainder.
- **Multiples** - Multiples of a number are generated by multiplying other integers with the given number.
- **Highest Common Factor (HCF)** - The highest common factor of two numbers is the largest number that will divide both the numbers without leaving a remainder. It is also called as the greatest common divisor or GCD.
- **Least Common Multiple (LCM)** - The least common multiple of two numbers is the lowest number that is a multiple of both the numbers.

TYPE	APPROACH
Find the greatest number that will exactly divide a, b and c.	HCF (a, b, c)
Find the greatest number that will divide a, b and c leaving remainders of x, y and z respectively.	HCF (a - x, b - y, c - z)
Find the greatest number which when it divides a, b and c will leave the same remainder in each case.	HCF (a - b, b - c, c - a)
Find the least number which is exactly divisible by a, b and c.	LCM (a, b, c)
Find the least number which when divided by a, b and c leaves the same remainder 'r' in each case.	LCM (a, b, c) + r
Find the least number which when divided by a, b and c leaves the remainders x, y and z respectively.	Check if $a - x = b - y = c - z = K$ . If this is the case, then $\text{LCM}(a, b, c) - K$

### Drill

- Classify the following numbers as rational or irrational and give your reason.
  - 6543 \_\_\_\_\_.
  - $\sqrt{9}$  \_\_\_\_\_.
  - 0.135634876239705... \_\_\_\_\_.
  - 0.5732435435435435... \_\_\_\_\_.
  - $\sqrt{11}$  \_\_\_\_\_.
- Give an example of a number that would satisfy the following conditions.

- A number that is: Real, Rational, Whole, Integer and Natural \_\_\_\_\_.
  - A number that is: Real and Irrational \_\_\_\_\_.
  - A number that is: Real, Rational and Non integer \_\_\_\_\_.
3. Mark the letter (a - g) that will correspond to the position of the following numbers in the Venn diagram given below in the space provided against each of the numbers. Please note that some numbers might not fit in the diagram.



-0.263 ( )	245 ( )	-67 ( )	4783 ( )
0.3242424... ( )	0 ( )	$\pi$ ( )	$\sqrt{5}$ ( )

4. Use the divisibility rules to circle the appropriate entries in the table.

Number	Divisible by							
15	2	3	4	5	6	8	9	11
27	2	3	4	5	6	8	9	11
36	2	3	4	5	6	8	9	11
268	2	3	4	5	6	8	9	11
4518	2	3	4	5	6	8	9	11
3619	2	3	4	5	6	8	9	11
15000	2	3	4	5	6	8	9	11

5. Last year, a chewing gum company produced 87,195 packs of gum. The company produced the same number of packs of each flavor of gum. How many different flavours of gum could the company have produced?

a. 9                      b. 10                      c. 5                      d. 2

6. Apply divisibility tests to find the missing digits such that,
- 12473\_ is divisible by 9
  - 36412\_ is divisible by 33
  - 1245\_42 is divisible by 11
  - 12875\_ is divisible by 8

Find the last digit of  $4^{55}$ .

8. Find the last digit of  $135647^{34}$ .

9. Find the remainder when  $3^{75}$  is divided by 5.

10. Find the rightmost non-zero integer of the expression  $1430^{343} + 1470^{367}$

11. Find the remainder when  $7^{203}$  is divided by 4.

12. Find the highest power of 12 in 100!.

13. What is the number of factors of the number 3600?

14. Find the HCF of 20 and 30.

15. Find the HCF of 12 and 14.

16. Find the LCM of 5 and 7.

17. Find the LCM of 6 and 10.

18. Find the HCF and LCM of 50 and 70.

19. Two lighthouses can be seen from the top of the hill. The first flashes once every 3 seconds and the other flashes once every 5 seconds. If they flash at the same time, how long will it be before they flash at the same time again?

LH1		LH2	
0	8	0	8
1	9	1	9
2	10	2	10
3	11	3	11
4	12	4	12
5	13	5	13
6	14	6	14
7	15	7	15

20. The front wheels of a toy truck are 4 inches in circumference. The back wheels are 7 inches in circumference. If the truck travels in a straight line without slippage, how many inches will the truck have travelled when the front wheels have made 12 revolutions more than the back wheels?
21. Find the greatest number that will exactly divide 24, 36 and 42.
22. Find the greatest number that will divide 27, 38 and 47 leaving remainders of 3, 2 and 5 respectively.
23. Find the greatest number which when it divides 74, 110 and 182 will leave the same remainder in each case.
24. Find the least number which is exactly divisible by 12, 8 and 10.
25. Find the least number which when divided by 12, 8 and 10 leaves the same remainder '7' in each case.
26. Find the least number which when divided by 12, 8 and 10 leaves the remainders 10, 6 and 8 respectively.

#### Concept review questions

1. If both  $11^2$  and  $3^3$  are factors of the number  $a \times 4^3 \times 6^6 \times 13^{11}$ , then what is the smallest possible value of  $a$ ?
- a. 121      b. 3267      c. 363      d. 33
2.  $323^2 - 322^2 =$ .
- a. 645      b. 643      c. 654      d. 653
3. Let  $n$  be the number of different 5 digit numbers, divisible by 4 with the digits 1, 2, 3, 4, 5 and 6 with no digit being repeated in the numbers. What is the value of  $n$ ?
- a. 144      b. 168      c. 192      d. None
4. A person starts multiplying consecutive positive integers from 20. How many numbers should he multiply before he will have a result that will end with 3 zeroes?
- a. 11      b. 10      c. 6      d. 5
5. If 'x' is a prime number greater than 5, then what is the remainder when 'x' is divided by 6?
- a. 5      b. 11      c. 1 or 5      d. None
6. On dividing a number by 9, the remainder is 8. The quotient so obtained when divided by 11, leaves the remainder 9. The new

quotient obtained when divided by 13, leaves a remainder 8. Find the remainder when the number is divided by 1287.

- a. 879      b. 881      c. 883      d. 885
7. Find A and B if the number A8563145B is divisible by 88?
- a. 2, 6      b. 3, 6      c. 4, 6      d. 2, 4
8. A certain number when successively divided by 8 and 11 leaves remainders 3 and 7 respectively. What will be the remainder when the product of 8 and 11 divides the number?
- a. 3      b. 21      c. 59      d. 68
9. The units digit of the expression  $23^{22} \times 565^{46} \times 91^{43}$  is
- a. 5      b. 0      c. 3      d. 1
10. What should be the maximum capacity of the measure to draw 126, 54 and 144 litres from three different cans?
- a. 8      b. 7      c. 16      d. 18
11. What is the least number which when divided by 7, 8 and 11 always gives 6 as remainder?
- a. 624      b. 622      c. 616      d. 654
12. Find the least number which when divided by 12, leaves a remainder of 10, when divided by 24, leaves a remainder of 22 and when divided by 32, leaves a remainder of 30?
- a. 96      b. 98      c. 94      d. 92
13. Four bells are heard at intervals of 2, 3, 5 and 7 minutes respectively. If all bells toll together exactly at 9 a.m., they will again be heard together at
- a. 10.10 am      b. 9.30 am      c. 11.45 am      d. 12.30 am
14. The LCM and HCF of  $\frac{3}{5}$ ,  $\frac{4}{7}$  and  $\frac{2}{9}$  are
- a.  $\frac{12}{315}$ ,  $\frac{1}{35}$       b. 12, 1      c.  $\frac{12}{315}$ ,  $\frac{1}{315}$       d. None
15. The total number of two-digit numbers which have only 3 factors (including 1) will be
- a. 7      b. 2      c. 4      d. 17
16.  $10^{25} - 7$  is divisible by
- a. 2      b. 3      c. 9      d. both 3 & 9
17. If 23XY59 is a number with all distinct digits and divisible by 11, then the two-digit number XY will be
- a. 61 or 17      b. 63 or 17      c. 23 or 43      d. 61 or 19
18. What will be the remainder when  $(1234567890123456789)^{24}$  is divided by 6561?
- a. 12      b. 1      c. 0      d. 11
19. A number when divided by a divisor D leaves a remainder of 13. When thrice the number is divided by D, the remainder obtained is 2. Find the number of possibilities of D.
- a. 0      b. 1      c. 2      d. 3
20.  $7^{6n} - 6^{6n}$ , where  $n$  is an integer greater than zero, is divisible by
- a. 13      b. 127      c. 559      d. More than one above