

- 1) Counting numbers 1, 2, 3, 4, 5, 6, ... etc. are known as natural numbers.
- 2) 1 is the smallest natural number.
- 3) 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 are called digits and a group of digits denoting a number is called a numeral or a number.
- 4) The method of representing a number in digits or figures is called notation and the method of expressing a number in words is called numeration. There are two methods of numeration:
 - (i) Indian system of numeration
 - (ii) International system of numeration.
- 5) Place value of a digit in a number = Its face value \times Position value
- 6)
 - 1 million = 10 lakhs
 - 10 million = 1 crore
 - 100 million = 10 crores
 - 1 billion = 100 crores or 1 Arab.
- 7)
 - 1 km = 1000 meter (m)
 - 1 meter = 100 centimetre (cm)
 - 1 cm = 10 millimetre (mm)
 - 1 kilogram (kg) = 1000 grams (gm)
 - 1 litre = 1000 millilitres (ml)

1 litre = 1000 millilitres (ml)

8) In order to estimate or round off a number to the nearest —

(a) tens:

(i) replace the ones digit by 0 and keep other digits as they are, if the digit at ones place is less than 5.

(ii) increase tens digit by 1 and replace the ones digit by 0, if the digit at ones place is greater than or equal to 5.

(b) hundreds:

(i) replace each one of the digits at tens and ones place by 0 and keep all other digits as they are, if the digit at tens place is less than 5.

(ii) increase the digit at hundreds place by 1 and replace each one of the digits at tens and ones place by 0, if the digit at tens place is greater than or equal to 5.

(c) thousands:

- (i) replace each one of the digits at hundreds, tens and ones place by 0 and keep all other digits as they are, if the digit at hundreds place is less than 5.
- (ii) increase the digit at thousands place by 1 and replace each one of the digits at hundreds, tens and ones place by 0, if the digit at hundreds place is greater than or equal to 5.

9) The roman numerals with the corresponding Hindu – Arabic numerals are:

<i>I</i>	<i>V</i>	<i>X</i>	<i>L</i>	<i>C</i>	<i>D</i>	<i>K</i>
1	5	10	50	100	500	1000

10) To get the values of given roman numerals, we use the following rules:

- (a) If a symbol is repeated, its value is added as many times as it occurs.
- (b) If a symbol of smaller value is written to the right of a symbol of greater value, we add its value to the value of greater symbol.
- (c) If a symbol of smaller value is written to the left of a symbol of greater value, its value is subtracted from the value of the greater symbol.
- (d) The symbols V, L and D are never written to the left of a symbol of greater value.
- (e) If a smaller numeral is placed between two larger numerals, it is always subtracted from the larger numeral immediately following it.
- (f) If a bar is placed over a numeral, it is multiplied by 1000.

Whole Numbers Formulas for Class 6



1. A factor of a number is that number which divides the number exactly.
2. A multiple of a number is exactly divisible by the number.
3. Every number is a factor as well as a multiple of itself.
4. 1 is a factor of every number and is the only number, which has exactly one factor.
5. Every number other than 1 has at least two factors, namely 1 and the number itself.
6. A number having no factor other than 1 and the number itself is called a prime number. In other words, a prime number has exactly two distinct factors, 1 and the number itself.
7. A number having factors other than 1 and the number itself is called a composite number.
8. The number 1 is neither a prime nor a composite number, because it has a single factor.
9. Numbers divisible by 2 are called even numbers.
10. Numbers not divisible by 2 are called odd numbers.
11. 2 is the only even prime number.
12. Every prime number other than 2 is odd, but every odd number is not necessarily a prime number.
13. Every even number greater than 4 can be expressed as the sum of two odd prime numbers.
14. Primes occurring in pairs with a difference of two are called twin primes.

15. Every number other than 1 can be uniquely expressed as the product of prime numbers except for the order of prime numbers.

16. A number is divisible by –

- (i) 2, if the unit's digit of the number is 0, 2, 4, 6 or 8.
- (ii) 3, if the sum of the digits is divisible by 3.
- (iii) 4, if the number formed by its digits in ten's and unit's places is divisible by 4.
- (iv) 5, if unit's digit is 0 or 5.
- (v) 6, if it is divisible by both 2 and 3.
- (vi) 8, if the number formed by its digits in hundred's, ten's and unit's places is divisible by 8.
- (vii) 9, if the sum of the digits is divisible by 9.

(viii) 10, if the unit's digit is 0.

(ix) 11, if the difference of the sum of its digits in odd places and the sum of its digits in even places (starting from unit's place) is either 0 or divisible by 11.

17. The H.C.F. of two or more numbers is the largest number that divides all the given numbers.

18. The L.C.M. of two or more numbers is the smallest number which is divisible by all the given numbers.

19. The product of H.C.F. and L.C.M. of two numbers equals their product. This result may not be true for more than two numbers.

20. The H.C.F. of any two prime or co-prime numbers equals 1.

21. The L.C.M. of any two prime or co-prime numbers equals their product.

22. The H.C.F. of two or more numbers is never greater than any of the numbers.

23. The L.C.M. of two or more numbers is never less than any of the numbers.

24. The H.C.F. of two or more numbers is a factor of their L. C.M.

25. If x is a factor of y , then the H.C.F. of x and y is x and L.C.M, of x and y is y .

Playing with Numbers Formulas for Class 6

1. Natural numbers are all the numbers from 1 onwards, i.e., 1, 2, 3, 4, 5, 6, and are used for counting.
2. Whole numbers are all the numbers from 0 onwards, i.e., 0, 1, 2, 3, 4, 5, 6, and are used for calculating.
3. The smallest natural number is 1 and the smallest whole number is 0.
4. The successor of a whole number is 1 more than the whole number.
5. The predecessor of a whole number is 1 less than the whole number. There is no predecessor of zero in whole numbers.
6. A number line is a horizontal line on which there are equally spaced points. These points represent whole numbers starting from zero.

Basic Geometrical Ideas Formulas for Class 6

If a, b, c , etc are whole numbers, then

1. $a + b$ is a whole number. [Closure property of addition]
2. $a \times b$ is a whole number. [Closure property of multiplication]
3. $(a - b)$ may or may not be a whole number.
4. $a + b$ may or may not be a whole number
5. $a + b = b + a$
6. $a \times b = b \times a$
7. $a - b$ is not equal to $b - a$ if a and b are unequal.
8. $a + b$ is not equal to $b + a$ if a and b are unequal.
9. $a + b = b + a$ if and only if $a = b$.
10. $(a + b) + c = a + (b + c)$ [Associativity of addition].
11. $a \times (b \times c) = (a \times b) \times c$ [Associativity of Multiplication].
12. $a \times (b + c) = a \times b + a \times c$ [Distributive of multiplication over addition].
13. $a \times (b - c) = a \times b - a \times c$, if $b > c$ [Distributive of multiplication over Subtraction].
14. $a + 0 = a = 0 + a$ [Existence of multiplicative identity].

14. $a \times 0 = 0 = 0 \times a$ [Existence of multiplicative identity].

15. $a \times 0 = 0 = 0 \times a$]Existence of multiplication identity]

16. $a \times 1 = a = 1 \times a$

17. $a + 1 = a.$

18. In general $(a - b) - c \neq a - (b - c).$

19. In general $(a + b) + c \neq a + (b + c).$

20. If a is dividend, b($\neq 0$) divisor, q quotient and r remainder, then $a = bq + r.$

[Division algorithm]

Integers Formulas for Class 6

1. The numbers. . . , -4, -3, -1, 0, 1, 2, 3, 4,. . . etc. are integers.
2. 1, 2, 3, 4, 5. . . are positive integers and -1,-2, -3,... are negative integers.
3. 0 is an integer which is neither positive nor negative.
4. On an integer number line, all numbers to the right of 0 are positive integers and all numbers to the left of 0 are negative integers.
5. 0 is less than every positive integer and greater than every negative integer.
6. Every positive integer is greater than every negative integer.
7. Two integers that are at the same distance from 0, but on opposite sides of it are called opposite numbers.
8. The greater the number, the lesser is its opposite.
9. The sum of an integer and its opposite is zero.
10. The absolute value of an integer is the numerical value of the integer without regard to its sign. The absolute value of an integer a is denoted by $|a|$ and is given by

$$|a| = \begin{cases} a, & \text{if } a \text{ is positive or } 0 \\ -a, & \text{if } a \text{ is a negative} \end{cases}$$

11. The sum of two integers of the same sign is an integer of the same sign whose absolute value is equal to the sum of the absolute values of the given integers.

12. The sum of two integers of opposite signs is an integer whose absolute value is the difference of the absolute values of addend and whose sign is the sign of the addend having greater absolute value.
13. To subtract an integer b from another integer a , we change the sign of b and add it to a . Thus, $a - b = a + (-b)$.
14. All properties of operations on whole numbers are satisfied by these operations on integers.
15. If a and b are two integers, then $(a - b)$ is also an integer.
16. $-a$ and a are negative or additive inverses of each other.
17. All the properties applicable to whole numbers are applicable to integers in addition, the subtraction operation has the closure property.

Mensuration Formulas for Class 6

1. The size of a line segment is its length.

2. Various units of measurement are connected by the following relations:

1 kilometre = 1000 metre (m)

1 metre = 100 centimetre (cm)

1 decimetre = 10 centimetre (cm)

1 metre = 10 decimetre (dm)

1 centimetre = 10 millimetre (mm)

1 foot = 12 inches

1 yard = 3 feet

22 yards = 1 chain

3. A closed plane figure together with its interior is called the region enclosed by it.

4. The sum of lengths of all sides of a plane figure or the length of its boundary is called the 'perimeter' of the figure.

5. The measurement of the region enclosed by a closed plane figure is called the 'area' of the plane figure.

6. A square centimetre is the area of the region formed by a square of side 1 cm.

7. Standard units of area and their relations are:

$$100 \text{ mm}^2 = 1 \text{ cm}^2$$

$$100 \text{ cm}^2 = 1 \text{ dm}^2$$

$$100 \text{ dm}^2 = 1 \text{ m}^2$$

$$10000 \text{ cm}^2 = 1 \text{ m}^2$$

$$100 \text{ m}^2 = 1 \text{ are}$$

$$100 \text{ ares} = 1 \text{ hectare}$$

$$100 \text{ hectares} = 1 \text{ sq. km.}$$

8. Perimeter of a rectangle = $2 (\text{Length} + \text{Breadth})$ or, $P = 2(l + b)$

Perimeter of a square = $4 \times (\text{Side})$ or, $P = 4l$

Area of a rectangle = $\text{Length} \times \text{Breadth}$ or, $A = l \times b$ Area A

Also, length of a rectangle $\frac{\text{Area}}{\text{Breadth}}$ or, $l = \frac{A}{b}$

Breadth of a rectangle $\frac{\text{Area}}{\text{Length}}$ or, $b = \frac{A}{l}$, Area of a square = $(\text{Side})^2$ or, $A = l \times l$.

Algebra Formulas for Class 6

1. The letters which are used to represent numbers are called literal numbers or literals.
2. The literal numbers themselves as well as the combinations of literal numbers and numbers obey all the rules (and signs) of addition, subtraction, multiplication and division of numbers along with the properties of these operations.
3. $x \times y = xy$, $5 \times x = 5x$, $1 \times x = x$, $x \times 3 = 3x$
4. $a \times a \times \dots \times 12 \text{ times} = a^{12}$, $y \times y \times \dots \times 15 \text{ times} = y^{15}$.
5. In x^9 9, is called the index or exponent and x is called the base. In a^5 , the index or exponent is 5 and the base is a.
6. A symbol having a fixed numerical value is called a constant.

Ratio and Proportion Formulas for Class 6

1. The ratio of a number 'a' to another number 'b' ($b \neq 0$) is a fraction $\frac{a}{b}$ and is written as $a : b$.
2. In the ratio $a : b$, the first term is a and the second term is b.
3. A ratio is said to be in the simplest form if its two terms have no common factor other than 1
4. The ratio of two numbers is usually expressed in its simplest form.
5. The ratio of two quantities is an abstract quantity, i.e., it has no units in itself.
6. An equality of two ratios is called a proportion. If $a : b = c : d$, then we write $a : b :: c : d$.
7. The numbers a, b, c, d are in proportion if the ratio of the first two is equal to the ratio of last two, i.e., $a : b = c : d$.
8. If four numbers a, b, c, d are in proportion, then a and d are known as extreme terms and b and c are called middle terms.
9. Four numbers are in proportion if the product of extreme terms is equal to the product of middle terms, i.e., $a : b :: c : d$ if and only if $ad = bc$.

10. From the terms of a given proportion, we can make three more proportions.

11. If $a : b = b : c$, then a, b, c are said to be in continued proportion.

12. if a, b, c are in continued proportion, i.e., $a : b :: b : c$, then b is called the mean proportional between a and c .

13. More is the number of articles, more is the value.

\therefore Value of a given number of articles = (Value of one article) \times (Number of articles)

14. Less is the number of articles, less is the value,

\therefore Value of one article = $\frac{\text{Value of given number of articles}}{\text{Number of articles}}$

15. The method of finding first the value of one article from the value of the given number of articles and then the value of the required number of articles is called the unitary method.

Geometry Formulas for Class 6

Geometry is the study of different shapes or figures.

1. A line segment corresponds to the shortest distance between two points. The line segment joining points A and B is denoted by \overline{AB}
2. Two distinct lines meeting at a point are called intersecting lines. Two parallel lines will never intersect each other.
3. A polygon is a simple closed figure comprising different line segments.
 - a) The line segments are the sides of the polygon.
 - b) Any two sides with a common endpoint are said to be adjacent sides.
 - c) The point where a pair of sides meet is called a vertex.
 - d) The endpoints located on the same sides are adjacent vertices.
 - e) The line segment joining the endpoints of any two non-adjacent vertices is called a diagonal.
4. A quadrilateral is a four-sided polygon. In a quadrilateral ABCD, \overline{AB} & \overline{DC} and \overline{AD} & \overline{BC} are pairs of opposite sides. $\angle A$ & $\angle C$ and $\angle B$ & $\angle D$ are pairs of opposite angles. $\angle A$ is adjacent to $\angle B$ & $\angle D$; similar relations hold for the other three angles as well.