

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

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

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. To find the product of two integers, we multiply their absolute values and give the result a plus sign if both the numbers have the same sign or a minus sign otherwise.

18. To find the quotient of one integer divided by another non-zero integer, we divide their absolute values and give the result a plus sign if both the numbers have the same sign or a minus sign otherwise.
19. All the properties applicable to whole numbers are applicable to integers in addition, the subtraction operation has the closure property.
20. Any integer when multiplied or divided by 1 gives itself and when multiplied or divided by -1 gives its opposite.
21. When expression has different types of operations, some operations have to be performed before the others. That is, each operation has its own precedence. The order in which operations are performed is division, multiplication, addition and finally subtraction (DMAS).
22. Brackets are used in an expression when we want a set of operations to be performed before the others.
23. While simplifying an expression containing brackets, the operations within the innermost set of brackets are performed first and then those brackets are removed followed by the ones immediately after them till all the brackets are removed.
24. While simplifying arithmetic expressions involving various brackets and operations, we use BODMAS rule.

Fractions and Decimals Formulas for Class 7

Fractions:

1. A fraction is a number representing a part of a whole.
2. A fraction can be expressed in the form $\frac{a}{b}$, where a, b are whole numbers and $b \neq 0$.
3. In a fraction $\frac{a}{b}$ we call 'a' as numerator and 'b' as denominator.
4. A fraction whose numerator is less than the denominator is called a proper fraction.
5. A fraction whose numerator is more than or equal to the denominator is called an improper fraction.
6. A combination of a whole number and a proper fraction is called a mixed fraction.
7. To get a fraction equivalent to a given fraction, we multiply (or divide) its numerator and denominator by the same non-zero number.
8. Fractions having the same denominators are called like fractions. Otherwise, they are called unlike fractions.

9. A fraction is said to be in its lowest terms if its numerator and denominator have no common factor other than 1.

10. To compare fractions, we use the following steps:

Step I Find the LCM of the denominators of the given fractions.

Step II Convert each fraction to its equivalent fraction with denominator equal to the LCM obtained in step I.

Step III Arrange the fractions in ascending or descending order by arranging numerators in ascending or descending order.

11. To convert unlike fractions into like fractions, we use the following steps:

Step I Find the LCM of the denominators of the given fractions.

Step II Convert each of the given fractions into an equivalent fraction having denominator equal to the LCM obtained in step I.

12. To add (or subtract) fractions, we may use the following steps:

Step I Obtain the fractions and their denominators.

Step II Find the LCM of the denominators.

Step III Convert each fraction into an equivalent fraction having its denominator equal to the LCM obtained in step II.

Step IV Add (or subtract) like fractions obtained in Step III.

13. Product of two fraction = $\frac{\text{Product of their numerator}}{\text{Product of their denominators}}$

14. Two fractions are said to be reciprocal of each other, if their product is 1. The reciprocal of a non-zero fraction $\frac{a}{b}$ is equal to $\frac{b}{a}$

15. The division of a fraction $\frac{a}{b}$ by a non-zero fraction $\frac{c}{d}$ is the product of $\frac{a}{b}$ with the reciprocal of $\frac{c}{d}$

Decimals:

1. Decimals are an extension of our number system.
2. Decimals are fractions whose denominators are 10, 100, 1000 etc.
3. A decimal has two parts, namely, the whole number part and decimal part.
4. The number of digits contained in the decimal part of a decimal number is known as the

number of decimal places.



5. Decimals having the same number of places are called like decimals, otherwise they are known as unlike decimals.

6. We have, $0.1 = 0.10 = 0.100$ etc, $0.5 = 0.50 = 0.500$ etc and so on. That is by annexing zeros on the right side of the extreme right digit of the decimal part of a number does not alter the value of the number.

7. Unlike decimals may be converted into like decimals by annexing the requisite number of zeros on the right side of the extreme right digit in the decimal part.

8. Decimal numbers may be converted by using the following steps.

Step I Obtain the decimal numbers

Step II Compare the whole parts of the numbers. The number with greater whole part will be greater. If the whole parts are equal, go to next step.

Step III Compare the extreme left digits of the decimal parts of two numbers. The number with greater extreme left digit will be greater. If the extreme left digits of decimal parts are equal, then compare the next digits and so on.

9. A decimal can be converted into a fraction by using the following steps:

Step I: Obtain the decimal.

Step II: Take the numerator as the number obtained by removing the decimal point from the given decimal.

Step III: Take the denominator as the number obtained by inserting as many zeros with 1 (e.g. 10, 100 or 1000 etc.) as there are number of places in the decimal part.

10. Fractions can be converted into decimals by using the following steps:

Step I: Obtain the fraction and convert it into an equivalent fraction with denominator 10 or 100 or 1000 if it is not so.

Step II: Write its numerator and mark decimal point after one place or two places or three places from right towards left if the denominator is 10 or 100 or 1000 respectively. If the numerator is short of digits, insert zeros at the left of the numerator.

11. Decimals can be added or subtracted by using the following steps:

Step I: Convert the given decimals to like decimals.

Step II: Write the decimals in columns with their decimal points directly below each other so that tenths come under tenths, hundredths come under hundredths and so on.

Step III: Add or subtract as we add or subtract whole numbers.

Step IV: Place the decimal point, in the answer, directly below the other decimal points.

12. In order to multiply a decimal by 10, 100, 1000 etc., we use the following rules:

Rule I: On multiplying a decimal by 10, the decimal point is shifted to the right by one place.

Rule II: On multiplying a decimal by 100, the decimal point is shifted to the right by two places.

Rule III: On multiplying a decimal by 1000, the decimal point is shifted to the right by three places, and so on.

13. A decimal can be multiplied by a whole number by using following steps:

Step I: Multiply the decimal without the decimal point by the given whole number.

Step II: Mark the decimal point in the product to have as many places of decimal as are there in the given decimal.

14. To multiply a decimal by another decimal, we follow following steps:

Step I: Multiply the two decimals without decimal point just like whole numbers.

Step II: Insert the decimal point in the product by counting as many places from the right to left as the sum of the number of decimal places of the given decimals.

15. A decimal can be divided by 10, 100, 1000 etc by using the following rules:

Rule I When a decimal is divided by 10, the decimal point is shifted to the left by one place.

Rule II When a decimal is divided by 100, the decimal point is shifted to the left by two places.



Rule III When a decimal is divided by 1000, the decimal point is shifted to the left by three places.

16. A decimal can be divided by a whole number by using the following steps:

Step I: Check the whole number part of the dividend.

Step II: If the whole number part of the dividend is less than the divisor, then place a 0 in the ones place in the quotient. Otherwise, go to step III.

Step III: Divide the whole number part of the dividend.

Step IV: Place the decimal point to the right of ones place in the quotient obtained in step I.

Step V: Divide the decimal part of the dividend by the divisor. If the digits of the dividend are exhausted, then place zeros to the right of dividend and remainder each time and continue the process.

17. A decimal can be divided by a decimal by using the following steps:

Step 1 Multiple the dividend and divisor by 10 or 100 or 1000 etc. to convert the divisor into a whole number.

Step II Divide the new dividend by the whole number obtained in step I.

Data Handling Formulas for Class 7

1. A trial is an action which results in one or several outcomes.
2. An experiment in which the result of a trial cannot be predicted in advance is called a random experiment.
3. An event associated to a random experiment is the collection of some outcomes of the experiment.
4. An event associated with a random experiment is said to happen if any one of the outcomes satisfying the definition of the event is an outcome of the experiment when it is performed.
5. The Empirical probability of happening of an event E is defined as

$$P(E) = \frac{\text{Number of trials in which the event happened}}{\text{Total number of trials}}$$

Lines and Angles Formulas for Class 7

1. A line which intersects two or more given lines at distinct points is called a transversal to the given lines.
2. Lines in a plane are parallel if they do not intersect when produced indefinitely in either direction.
3. The distance between two intersecting lines is zero.
4. The distance between two parallel lines is the same everywhere and is equal to the perpendicular distance between them.
5. If two parallel lines are intersected by a transversal then
 - (i) pairs of alternate (interior or exterior) angles are equal.
 - (ii) pairs of corresponding angles are equal.
 - (iii) interior angles on the same side of the transversal are supplementary.
6. If two non-parallel lines are intersected by transversal then none of (i), (ii) and (iii) hold true in 5.
7. If two lines are intersected by a transversal, then they are parallel if any one of the following is true:
 - (i) The angles of a pair of corresponding angles are equal.
 - (ii) The angles of a pair of alternate interior angles are equal.

(iii) The angles of a pair of interior angles on the same side of the transversal are supplementary.

The Triangle and Its Properties Formulas for Class 7



1. A triangle is a figure made up by three line segments joining, in pairs, three non-collinear points. That is, if A, B, C are three non-collinear points, the figure formed by three line segments AB, BC and CA is called a triangle with vertices A, B, C.
2. The three line segments forming a triangle are called the sides of the triangle.
3. The three sides and three angles of a triangle are together called the six parts or elements of the triangle.
4. A triangle whose two sides are equal, is called an isosceles triangle.
5. A triangle whose all sides are equal, is called an equilateral triangle.
6. A triangle whose no two sides are equal, is called a scalene triangle.
7. A triangle whose all the angles are acute is called an acute triangle.
8. A triangle whose one of the angles is a right angle is called a right triangle.
9. A triangle whose one of the angles is an obtuse angle is called an obtuse triangle.
10. The interior of a triangle is made up of all such points P of the plane, as are enclosed by the triangle.

11. The exterior of a triangle is that part of the plane which consists of those points Q, which are neither on the triangle nor in its interior.
12. The interior of a triangle together with the triangle itself is called the triangular region.
13. The sum of the angles of a triangle is two right angles or 180° .
14. If a side of a triangle is produced, the exterior angle so formed is equal to the sum of the interior opposite angles.
15. In any triangle, an exterior angle is greater than either of the interior opposite angles.
16. The sum of any two sides of a triangle is greater than the third side.
17. In a right triangle, if a, b are the lengths of the sides and c that of the hypotenuse, then
$$c^2 = a^2 + b^2$$
18. If the sides of a triangle are of lengths a, b and c such that $c^2 = a^2 + b^2$, then the triangle is right-angled and the side of length c is the hypotenuse.
19. Three positive numbers a, b, c in this order are said to form a Pythagorean triplet, if $c^2 = a^2 + b^2$. Triplets (3, 4, 5) (5, 12, 13), (8, 15, 17), (7, 24, 25) and (12, 35, 37) are some Pythagorean triplets.

Congruence of Triangles Formulas for Class 7

1. Two figures are congruent, if they have exactly the same shape and size.
2.
 - (i) Two line segments are congruent, if they have the same length.
 - (ii) Two angles are congruent, if they have the same measure.
 - (iii) Two squares are congruent, if they have the same side length.
 - (iv) Two rectangles are congruent, if they have the same length and breadth.
 - (v) Two circles are congruent, if they have the same radius.
3. Two triangles are congruent, if in matching of their vertices, the three sides and the three angles of one triangle are respectively equal to the corresponding parts of the other.
4. SSS Congruence Condition: Two triangles are congruent, if three sides of one triangle are respectively equal to the three sides of the other.
5. SAS Congruence Condition: Two triangles are congruent, if two sides and the included angle of one are respectively equal to the two sides and the included angle of the other.

6. ASA Congruence Condition: Two triangles are congruent, if two angles and the included side of the one are respectively equal to the two angles and the included side of the other.
7. RHS Congruence Condition: Two right triangles are congruent, if the hypotenuse and one side of the one triangle are respectively equal to the hypotenuse and one side of the other
8. In an isosceles triangle, the angles opposite to equal sides are equal.
9. The bisector of the vertical angle of an isosceles triangle bisects the base at right angles.
10. Two congruent figures are equal in area but two figures having the same area need not be congruent.

Rational Numbers Formulas for Class 7

1. Numbers that can be expressed in the form $\frac{p}{q}$, where q is a non-zero integer and p is any integer are called rational numbers.
2. Every integer is a rational number but a rational number need not be an integer.
3. Every fraction is a rational number but a fraction need not be a rational number.
4. A rational number $\frac{p}{q}$ is said to be in the standard form if q is a positive integer and the integers $\frac{p}{q}$ have no common divisor other than 1.
5. A rational numbers $\frac{p}{q}$ is positive, if p and q are either both positive or both negative.
6. A rational number $\frac{p}{q}$ is negative, if p and q are of opposite signs.
7. Two rational numbers are equal if they have the same standard form.

8. To convert a rational number to an equivalent rational number, either multiply or divide both its

numerator and denominator by a non-zero integer.

9. If $\frac{x}{y}$ is a rational number and m is any non-zero integer, then $\frac{x}{y} = \frac{x \times m}{y \times m}$

10. If $\frac{x}{y}$ is a rational number and m is a common divisor of x and y , then $\frac{x}{y} = \frac{x \div m}{y \div m}$

11. If x and y are positive integers, then the rational numbers $\frac{x}{y}$ and $\frac{-x}{-y}$ both positive and the rational numbers $\frac{-x}{y}$ and $\frac{x}{-y}$ negative.

12. $\frac{a}{b} = \frac{c}{d}$ only when $a \times d = b \times c$.

13. If there are two rational numbers with common denominator, then one with the larger numerator is larger than the other.

14. Every positive rational number is greater than zero.
15. Every negative rational number is less than zero.
16. The rational numbers can be represented on the number line.

Algebraic Expressions Formulas for Class 7



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. $x \times y = xy$, $5 \times x = 5x$, $1 \times x = x$, $x \times 4 = 4x$.
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.
7. A symbol which takes various numerical values is called a variable.
8. A combination of constants and variables connected by the signs of fundamental operations of addition, subtraction, multiplication and division is called an algebraic expression.
9. Various parts of an algebraic expression which are separated by the signs of '+' or '-' are called the terms of the expression.

10. An algebraic expression is called a monomial, a binomial, a trinomial, a quadrinomial according as it contains one term, two terms, three terms and four terms respectively.
11. Each term in an algebraic expression is a product of one or more number(s) and/or literal number(s). These number(s) and or literal number(s) are known as the factors of that term.
12. A term of the expression having no literal factor is called a constant term.
13. In a term of an algebraic expression any of the factors with the sign of the term is called the coefficient of the product of the factors.
14. The terms having the same literal factors are called like or similar terms.
15. The terms not having same literal factors are called unlike or dissimilar terms.
16. The sum or difference of several like terms is another like term whose coefficient is the sum or difference of those like terms.
17. In adding or subtracting algebraic expressions, we collect different groups of like terms and find the sum or difference of like terms in each group.
18. To subtract an expression from another, we change the sign (from + ' to ' - ' and from ' - ' to +) of each term of the expression to be subtracted and then add the two expressions.

1. If a is a non-zero rational number and n is a natural number, then the product

$$a \times a \times a \times \dots \times a$$

(n times)

is denoted by a^n and is read as 'a raised to the power n '. Rational number ' a '

is called the base and natural number n is known as the exponent. Also, a^n is known as the

$$a \times a \times a \times \dots \times a$$

exponential form

(n times)

2. For any non-zero rational number, we have $a^0 = 1$ and $a^1 = a$.

3. If a and b are non-zero rational numbers and m and n are natural numbers, then following are the laws of exponents:

(i) $a^m \times a^n = a^{m+n}$

(ii) $\frac{a^m}{a^n} = a^{m-n}, (m > n)$

(iii) $(a^m)^n = a^{mn} = (a^n)^m$

(iv) $(a \times b)^n = a^n b^n$

(v) $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$

(b) b''

Symmetry Formulas for Class 7

1. If a line divides a figure into two parts such that when the figure is folded about the line the two parts of the figure coincide, then the line is known as the line of symmetry. The line of symmetry is also known as the axis of symmetry.
2. A figure is said to have rotational symmetry if it fits on to itself more than once during a full turn i.e. rotation through 360° .
3. The number of times a figure fits onto itself in one full turn is called the order of rotational symmetry.
4. Following table provides the details of linear and rotational symmetries of various figures:

Figure	Line symmetry	No. of Line symmetry	Rational Symmetry	Centre of Rotation	Order of Rotational Symmetry
Square	Yes	4	Yes	Intersection of diagonals	4
Rectangle	Yes	2	Yes	Intersection of diagonals	2
Equilateral Triangle	Yes	3	Yes	Centroid	3
Regular Hexagon	Yes	6	Yes	Centre of the hexagon	6
Circle	Yes	Unlimited	Yes	Centre	Unlimited
Parallelogram	Yes	2	Yes	Intersection of diagonals	2
Rhombus	Yes	2	Yes	Intersection of diagonals	2

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