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The first recorded use of areas was in ancient Babylon, where they used it to measure the amount of land that was owned by different populations for taxation purposes. Later in 287 BC, the great mathematician Archimedes from Greece discovered the area and the perimeter of the circle and the relationship between spheres. Archimedes, no doubt, wasn't the first to realize the fact. However, he was, as far as we know, the first to prove it formally. He also gave the earliest proofs for the volume of the sphere and surface area.Definition of AreaIn geometry, the area can be defined as the space occupied by the surface of an object or any flat shape. The area of an object is the number of unit squares that cover the surface of a closed object. The area is measured in square units such as square feet, square centimeters, square inches, etc.The origin of the word is from 'area' in Latin, which translates to a vacant piece of level ground. This further led to a derivation of the area as a particular amount of space contained within a set of boundaries.To determine the size of the carpet to be bought, we often find the area of the room floor.To cover the floor with tiles, to cover the wall with paint or wallpaper or to build a swimming pool are other examples, where the area is computed.In reality, not every plane surface can be clearly classified as a rectangle, square or a triangle. For finding the area of a composite figure that contains more than one shape, we will find the sum of the area of all the shapes forming the composite figure.The area of the outside surface of a three-dimensional shape or a solid is called Surface Area of that surface. For example, a rectangular prism has 6 rectangular bases and lateral faces. Thus, the total surface area is equal to the sum of the areas of all 6 rectangles.Area FormulasIn general, we can say that the area of shapes can be defined as the quantity of paint required to cover the surface with a single coat. These are the following ways to calculate the area based on the number of sides that exist in the shape, as illustrated below in fig. (Images will be uploaded soon)What are 3D Shapes?The three-dimensional shapes, also known as solid shapes, are those which have three dimensions such as length, breadth and thickness. The two different measures which are used to define the three-dimensional shapes are surface area and volume. In general, the 3D shapes are obtained from the rotation of two-dimensional shapes. Thus, the surface area of any two-dimensional shapes should be a 2D shape. If we want to calculate the surface area of any solid shape, we can easily calculate it from the area of 2D shapes.Area of 3D Shapes FormulaAccording to the International System of Units (SI), the standard unit of area is the square meter (written as m2) and it is also the area of a square whose sides are one meter long. For example, a definite shape with an area of three square meters would have the same area as three such squares. The surface area of any solid object is a measure of the total area which the surface of the object occupies.For 3D/ solid shapes like cuboid, cube, cylinder, sphere and cone, the area is updated to the concept of the surface area of the shapes. The formulas for 3D shapes are given in the table below:Area Formula for Different ShapesShapeAreaTermsCircle $\pi \times r^2$ r = radius of the circleTriangle $\frac{1}{2} \times b \times hb$ = base h = heightSquare a^2 a = length of sideRectangle $l \times w$ l = length w = widthParallelogram $b \times hb$ = base h = vertical heightTrapezium $\frac{1}{2}(a + b) \times ha$ & b are length of parallel sides h = heightEllipsenaba = $\frac{1}{2}$ minor axisb = $\frac{1}{2}$ major axisFormulas for 3D ShapesShapeSurface AreaTermsCube $6a^2$ a = length of the edgeRectangular prism $2(wl + hl + hw)$ l = length w = width h = heightCylinder $2\pi r(r + h)$ r = radius of the circular base h = height of the cylinderConem $r + l$ r = radius of the circular base l = slant heightSphere $4\pi r^2$ r = radius of the sphereHemisphere $3\pi r^2$ r = radius of the hemisphereKnow More about AreaThe area is defined as a two-dimensional space that is taken up by an object. The concept of the area has a lot of real-life applications. For example, the area is used in farming, building, plotting lands, science and so much more like painting the walls of your room or buying new furniture for the house. The area can be determined with basic calculations and understanding. The number of square units inside a figure is used to find out the area for a square or rectangle. Sometimes, in the cases of polygons, one can find out the area by multiplying the length by the width.To find out the area of a Square, $A=s^2$ where s is the length of the sides of the square. To find out the area of a Rectangle $A=LW$, where L and W are the lengths of the rectangle's sides (length and width).To find out the area of a triangle $A=12bh$, where b and h are the base and height.To find out the area of a Parallelogram $A=bh$, where b is the length of the base and h is the height.To find out the area of a Circle $A=\pi r^2$, where r is the radius Geometry formulas are used for finding dimensions, perimeter, area, surface area, volume, etc. of the geometric shapes. Geometry is a part of mathematics that deals with the relationships of points, lines, angles, surfaces, solids measurement, and properties. There are two types of geometry: 2D or plane geometry and 3D or solid geometry. The 2D shapes are flat shapes that have only two dimensions, length, and width as in squares, circles, and triangles, etc. The 3D objects are solid objects, that have three dimensions, length, width, and height or depth, as in a cube, cuboid, sphere, cylinder, cone, Let us learn geometry formulas along with a few solved examples in the upcoming sections. What Are Geometry Formulas? The formulas used for finding dimensions, perimeter, area, surface area, volume, etc. of 2D and 3D geometric shapes are known as geometry formulas. 2D shapes consist of flat shapes like squares, circles, and triangles, etc., and cube, cuboid, sphere, cylinder, cone, etc are some examples of 3D shapes. The basic geometry formulas are given as: List of Geometry Formulas Below is the list of various geometry formulas for you according to the geometric shape. Basic geometry formulas where the mathematical constant π is used are, where, r = Radius; h = Height. and, l = Slant height The formula table depicts the geometry formulas used for different 2-D and 3-D shapes: SHAPES FORMULAS 1. Right Triangle Pythagoras Theorem: $a^2 + b^2 = c^2$ Area = $\frac{1}{2} ab$ Perimeter = $a + b + \sqrt{a^2 + b^2}$ Where, c = hypotenuse of a triangle a = altitude of a triangle b = base of a triangle 2. Triangle Perimeter, $P = a + b + c$ Area, $A = \frac{1}{2} bh$ Height, $h = 2(A/b)$ Where, a, b, c are the sides of a triangle. 3. Rectangle Perimeter = $2(l + w)$ Area = lw Diagonal, $d = \sqrt{(l^2 + w^2)}$ Where, l = length of a rectangle w = width of a rectangle 4.Parallelogram Perimeter, $P = 2(a + b)$ Area, $A = bh$ Height, $h = A/b$ Base, $b = A/h$ Where, a and b are the sides of a parallelogram h = height of a parallelogram 5. Trapezium Area, $A = \frac{1}{2}(a + b)h$ Height, $h = 2A/(a + b)$ Base, $b = 2(A/h) - a$ Where, a and b are the parallel sides h = distance between two parallel sides 6. Circle Circumference = $2\pi r$ Area = πr^2 Diameter = $2r$ Where, r = radius of a circle 7. Square Perimeter, $P = 4a$ Area, $A = a^2$ Diagonal, $d = a\sqrt{2}$ Side, $a = \sqrt{A} = d/2\sqrt{2}$ Where, a = side of a square 8. Arc Arc Length, $L = r\theta$ Area, $A = \frac{1}{2}r^2\theta$ Here, θ is the central angle in radians. Where, r = radius 9. Cube Area, $A = 6a^2$ Volume, $V = a^3$ Edge, $a = \sqrt[3]{V}$ Space diagonal = $a\sqrt{3}$ Where, a = side of a cube 10. Cuboid Surface Area, $A = 2(lb + bh + hl)$ Volume, $V = lbh$ Space diagonal, $d = \sqrt{(l^2 + b^2 + h^2)}$ Where, l = length b = breath h = height 11. Cylinder Total Surface Area, $A = 2\pi rh + 2\pi r^2$ Curved Surface Area, $Ac = 2\pi rh$ Volume, $V = \pi r^2h$ Base Area, $Ab = \pi r^2$ Radius, $r = \sqrt{(V/\pi h)}$ Where, r = radius of a cylinder h = height of a cylinder 12. Cone Total Surface Area, $A = \pi r(r+l) = \pi r[r+\sqrt{(h^2+r^2)}]$ Curved Surface Area, $Ac = \pi rl$ Volume of cone, $V = \frac{1}{3}\pi r^2h$ Slant Height of cone, $l = \sqrt{(h^2+r^2)}$ Base Area, $Ab = \pi r^2$ Where, r = radius of a cone h = height of a cone l = slant height What Are the Geometry Formulas of a Circle? The geometry formulas of a circle are listed below: Circumference = $2\pi r$ Area = πr^2 Diameter = $2r$ Where, r = radius of a circle What Are the Geometric Formulas of a Sphere? The two important geometry formulas of a sphere are the area and volume of a sphere. The surface area of a sphere is $A = 4\pi r^2$ and the volume of the sphere is $V = \frac{4}{3}\pi r^3$. What Are the Applications of Geometry Formulas? Geometry formulas are useful to find the perimeter, area, volume, and surface areas of two-dimensional and 3D Geometry figures. In our day-to-day life there are numerous objects which resemble geometric figures and the areas and volumes of these geometric figures can be calculated using these geometric formulas.

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