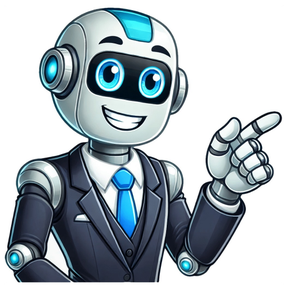
Continue



Calculate the volume of a circle with our Circle Volume Calculator. Simply enter the radius of the circle and height of the circle, then click the calculate button.The circle volume is calculated using the following formula:cv = π * r^2 * hCV = circle volumeπ = 3.14159.r = radius of circleh = height of circleThe circle volume is calculated by multiplying the area of the area by the height of the circle.First, Measure the radius of the circle thenNext, calculate the area of a circle (π * r^2).Next, Measure the height of the circleFinally, circle volume = area of circle * height of the circleExample: if the radius of the circle is 20 cm and the height of the circle is 15 cm then calculate the circle volumeGiven ValuesThe radius of a circle = 20 cmHeight of the circle = 15 cmPut the values into the formulaArea of a circle = π * r^2 = π * 20^2 = 1256.63 square centimetersvolume of circle = area * height = 1256.63 * 15 = 18849.5592 cubic centimeters.More Calculator The formula to calculate the Circle Volume is: \[CV = \pi \times R^2 \times H \] where \(CV \) is the Circle Volume (in³), \(R \) is the radius of the circle (in), and \(H \) is the height of the circle (in). Circle Volume refers to the volume of a cylindrical shape where the base is a circle. It is calculated by squaring the radius of the circle, multiplying by pi (π), and then multiplying by the height of the cylinder. Let's assume we have the following values: Radius (\(R \)) = 3 in Height (\(H \)) = 10 in Step 1: Square the radius: \[R^2 = 3^2 = 9 \] Step 2: Multiply by pi (π) and the height: \[CV = \pi \times 9 \times 10 = 282.74 \text{ in}^3 \] Therefore, the Circle Volume is \(CV = 282.74 \text{ in}^3 \). Waycalculator Calculator© - All Rights Reserved 2025 Learning how to find the volume of a circle is key in many areas, like engineering and science. This guide will show you how to calculate the volume of a circle using the radius, diameter, or height. By the end, you'll know the formulas and tips to find the volume accurately. The volume of a circle is important in many real-life situations, from making things to designing buildings. With the methods in this guide, you can easily figure out the volume of circles. This helps you make better decisions and improve your projects. Learn the essential formula for calculating the volume of a circle based on its radius, diameter, or height. Understand the key terms and definitions related to circle volume, including radius, diameter, and height. Discover the factors that affect the volume of a circle and how to account for them in your calculations. Explore the diverse applications of circle volume in various industries and research fields. Gain practical tips and strategies for performing accurate circle volume calculations with confidence. Calculating the volume of a circle is key in math and engineering. It's used in many real-life situations, like designing tanks and measuring liquids or gases. Knowing how to calculate circle volume is important for many professionals. For engineers, architects, and scientists, precise volume calculations are a must. They need to know the volume of a circle with diameter and height for their work. This is important for designing tanks, figuring out gas cylinder volumes, or studying pipe flow. The formula for cubic meter of a circle is crucial in making decisions. It helps ensure structures are the right size and can hold the right amount of material. Determining the storage capacity of cylindrical tanks, silos, and containers for liquids, gases, or granular materials. Calculating the volume of circular structures, such as domes, arches, or cylindrical buildings, for construction and architectural purposes. Measuring the volume of a circle in scientific research, such as the volume of a cell, a molecule, or a planet. Evaluating the efficiency of circular-shaped equipment or devices, like wheels, pulleys, or gears, by understanding their formula for a volume. Learning about how do you calculate round volume helps professionals make better decisions. It improves their designs and work across various industries and fields. The volume of a circle is a key idea in geometry. It shows the three-dimensional space a circle takes up. It's different from the circumference or area, which look at the circle's two dimensions. The volume looks at the circle's depth or height too. The volume of a circle is important in many areas like industrial engineering, scientific research, and everyday life. It helps figure out the capacity or space of a circular object. Knowing the volume formula lets you accurately find the volume of a circle for many real-world uses. Radius of the circle Height or depth of the circular object The mathematical formula for calculating volume These elements help you determine the volume form of a circle and calculate the circumference, volume, and area of a circle precisely. Knowing the circle formula volume is key to measuring a circle's three-dimensional shape accurately. MeasurementFormulaCircumferenceC = 2πrAreaA = πr²VolumeV = πr²h Learning the volume formula for a circle and what affects it lets you calculate the volume of a circle with ease. This skill is useful in many real-world situations. To understand circle volume, knowing key terms and measurements is key. The main parts in finding a circle's volume are the radius and the height or length. The radius is the distance from the center to the circle's edge. It's vital for figuring out the circle's volume. The diameter is the circle's width, going through the center. It's twice the radius, linking the two closely. The height or length is the circle's vertical size, often called the height of a circular column. This is key for finding the circle's total volume. Knowing these terms and how they relate to radius measurement and geometric calculations helps in accurately finding a circle's volume. The formula for finding a circle's volume is key in many areas, like engineering and science. It's a simple yet powerful tool. It helps us figure out the volume of a circle using its radius and height or length. The formula for the volume of a circle looks like this: Volume = π × r² × h In this formula: π (pi) is a constant with a value of approximately 3.14159. r stands for the circle's radius. h is the circle's height or length. To find the volume of a circle, just put in the radius and height or length. This gives you the cubic meter of the circle, which is how we measure volume. Knowing how to use the formula for calculating circle volume is crucial in many fields. It lets you find the volume of any circle, no matter its size or shape. Finding the volume of a circle is easy with just a few steps. If you want to know how to calculate round volume, how to calculate cubic volume, or how to calculate m3 of a circle, follow this guide. It will show you what to do. To find the volume of a circle, you need its radius (r). If you have the diameter (d), divide it by 2 to get the radius (r = d/2). Measure the radius (r) of the circle. Use the radius (r) in the formula: V = π × r². π is about 3.14. Do the math to find the circle's volume in units like cubic centimeters (cm³) or cubic meters (m³). Here are examples to show how to figure the area of a circle and its volume: Circle Radius (r)Volume CalculationVolume Result5 cmV = π × r² = 3.14 × (5 cm)² = 3.14 × 25 cm²78.5 cm³2.5 mV = π × r² = 3.14 × (2.5 m)² = 3.14 × 6.25 m²19.625 m³ By using this simple guide and the right formula, you can easily find the volume of any circle. This is true whether you're dealing with round volume, cubic volume, or m3 of a circle. Several factors can change the volume of a circle. It's important to know how these changes affect the volume. This knowledge helps with accurate calculations. The radius and height (or depth) are key to finding a circle's volume. The circle area formula is vital here. It uses the circle's area to calculate the volume. Changing the radius changes the area and the volume. Also, the height of the circle affects its volume. The cylinder volume formula combines the circle area with the height. This gives us the total volume of a circle-based structure. Let's look at a circular swimming pool. It has a radius of 10 feet and is 5 feet deep. Using the formula: V = 1/3 × π × r² × h, we find the volume is about 523.6 cubic feet. If we make the pool 8 feet deep, the volume jumps to 838.1 cubic feet. But if we make it only 3 feet deep, the volume drops to 314.2 cubic feet. The value of pi, about 3.14, is also crucial. Using this constant correctly is key for accurate volume measurements. When figuring out the volume of a circle, it's key to use the right units. Common units include cubic meters (m³), cubic feet (ft³), and liters (L). Knowing these units and how to switch between them helps with precise calculations and clear communication in many fields. The formula for the volume of a circle tank or any circular shape uses the radius (r) and height (h). The formula for the volume of a diameter uses diameter (d) instead. No matter the formula, the volume must be in the right units to be useful and clear. Cubic meters (m³): This is the standard volume unit in the International System of Units (SI). It's the volume of a cube that's 1 meter on each side. Cubic feet (ft³): Used a lot in the United States and other countries that use the imperial system. It's the volume of a cube that's 1 foot on each side. Liters (L): A metric volume unit, where 1 liter is the volume of a cube that's 10 centimeters on each side. Liters are often used for smaller volumes, like in liquids. Switching between these units is easy. For instance, to go from cubic meters to cubic feet, multiply the volume in m³ by 35.314. To switch from cubic feet to cubic meters, divide the volume in ft³ by 35.314. Knowing these conversions is key when dealing with volume units in fields like engineering, construction, science, and logistics. Knowing how to find the volume of a circle is key in many areas. It's used in industries and scientific studies. The formula for circles helps with calculating cubic volume, which is very useful. In industries, figuring out a circle's volume is vital. It helps with sizing tanks, pipes, and containers. Engineers use the volume of a circle with diameter and height to make sure systems work well and safely. The formula for cubic meter of a circle is crucial in building projects. It helps with everything from pouring concrete to moving materials. This ensures projects are done right. Scientists find the formula for circles and calculate cubic volume very useful. They use it in geology, oceanography, and astrophysics. It helps them study and model things like underground reservoirs and stars. In medicine and pharmacy, knowing how to calculate m3 of a circle is key. It helps with making sure drugs are given in the right amount. This makes sure treatments are safe and work well. IndustryApplicationImportance of Circle Volume CalculationManufacturingTank sizing, pipe dimensioning, container designEnsures proper capacity, flow rates, and material storageConstructionConcrete pouring, material transportation and storageEnables accurate volume calculations for efficient project planning and executionScientific ResearchGeological analysis, oceanographic modeling, astrophysical studiesCrucial for understanding and predicting natural phenomenaMedical and PharmaceuticalDrug delivery system design, dosage determinationEnsures the safety and efficacy of new treatments The skill of calculating the volume of a circle is vital in many fields. It helps with everything from making tanks to studying the universe. By using the formula and methods for how to calculate cubic volume, experts can improve their work. This leads to better decisions and new discoveries. To get precise circle volume calculations, make sure to measure the radius or diameter correctly. Use a trusted measuring tool and check your readings several times. Also, pay attention to the height or length of the circle, as it affects the volume. Choose the right formula for your needs. For simple shapes like a circular disk or column, use V = π × r² × h. But for complex shapes like a circle-based pyramid, you'll need a different formula to match its unique shape. Remember to use the same units of measurement throughout your calculations. Make sure to convert units if needed to keep everything consistent. Using the right units, like square inches or cubic feet, ensures your volume calculations are accurate. To find the volume of a circle, use the formula: V = π × r² × h. V is the volume, π (pi) is about 3.14, r is the radius, and h is the height. The formula for the circle's volume is: V = π × r² × h. V is the volume, π (pi) is about 3.14, r is the radius, and h is the height. For a round hole, use the same formula as for a circle: V = π × r² × h. V is the volume, π (pi) is about 3.14, r is the radius, and h is the depth. The formula for a circle tank's volume is the same as for any circular object: V = π × r² × h. V is the volume, π (pi) is about 3.14, r is the radius, and h is the tank's height. The formula for a circular column's volume is: V = π × r² × h. V is the volume, π (pi) is about 3.14, r is the radius, and h is the column's height. Use the formula: V = π × r² × h to find the cubic volume of a circle. V is the volume in cubic units, π (pi) is about 3.14, r is the radius, and h is the circle's height. The simple formula for the circle's volume is: V = π × r². V is the volume, π (pi) is about 3.14, and r is the radius. The formula for a circle-based pyramid's volume is: V = (1/3) × π × r² × h. V is the volume, π (pi) is about 3.14, r is the base radius, and h is the pyramid's height. Hanna Pamuła, PhDHanna PamułaPhDHanna (Hania) Pamuła holds a Ph.D. in Bioacoustics / Mechanical Engineering, obtained at AGH University of Science and Technology. She has participated in research work in labs in France and the UK and presented papers at several international conferences. Hania has a penchant for photography and graphic design. When not in the office, she's probably traveling, hiking, or out in the field, watching birds and recording their calls. See full profileCheck our editorial policy, Piotr MałekA graduate of Cracow's University of Economics, Piotr is a data analyst and technical content creator with a passion for tackling complex problems and making data accessible to all. With over 8 years in technical content creation, he has produced a wide range of materials—from blog posts and landing pages to case studies and documentation—while also starring in and producing educational videos. Known for his ability to break down intricate topics into clear, straightforward explanations, Piotr is dedicated to educating others and building communities around SaaS products. An avid cyclist, marathon runner, and triathlete, Piotr approaches both professional and personal challenges with the same dedication. When he's not analyzing data or creating content, he's often exploring new destinations or attempting to master complex board games (which he then tries, often unsuccessfully, to convince his wife to play). See full profileCheck our editorial policy, and Mateusz MuchaMateusz is a professional problem-solver with a lifelong passion for software development and numbers. In 2014, he launched Omni Calculator, a groundbreaking tool that allows him to accomplish his life mission: helping people make better decisions whenever calculations are needed. Today, Mateusz serves as the CEO of Omni Calculator, which attracts over 18 million visitors monthly. When he is not busy growing the business, he enjoys sports, with cycling being his favorite. See full profileCheck our editorial policyBogna Szyk and Jack Bowater1 630 people find this calculator helpfulTable of contentsSelectCubeRectangular prism (box)SphereHemisphereSpherical capEllipsoidCylinderHollow cylinder / tubeCapsuleConeConical frustumTriangular prismPyramidTruncated pyramidDid we solve your problem today?Check out 23 similar 3d geometry calculators Volume of a right circular cylinder is the space occupied by it. A cylinder is a geometric three-dimensional object that is very common in our daily life such as a coke can, paper roll, etc. It has two parallel and congruent circular bases that are connected by a curved surface (which is formed by the line segments joining the respective points of the bases). There are two types of cylinders: Right circular cylinder Oblique cylinder We will study more about the right circular cylinder and its volume in detail here with the help of a few solved examples and practice questions. What Is a Right Circular Cylinder? A right circular cylinder is a cylinder that has two congruent and parallel circular bases where each line segment that is a part of the lateral or the curved surface is perpendicular to the bases. The volume of a right circular cylinder is the number of unit cubes that can fit into it. The unit of volume is "cubic units". It is expressed as m3, cm3, km3, etc depending upon the given units. Let us see how to find the formula of the volume of a right circular cylinder. Volume of a Right Circular Cylinder Formula Let us consider a cylinder of radius 'r' and height 'h'. Let us assume that its volume is 'V'. Since the bases of the right circular cylinder are congruent and parallel circles, it is referred to as a circular prism (but in fact, a cylinder is not a prism). We know that the volume of any prism is its base area multiplied by its height. We know that each base of a right circular cylinder is a circle and hence its area is, πr2. The height of the cylinder is 'h'. So its volume is V = base area × height = πr2 × h = πr2h. By the above formula, we can say that the volume of a right circular cylinder is directly proportional to the square of its radius and also its height which means: If the radius of the base becomes double, then the volume becomes four times. If the height becomes double, then the volume also becomes double. How To Find the Volume of Right Circular Cylinder? As we learned in the previous section, the volume of a right circular cylinder of radius r and height h is V = πr2h. Thus, we follow the below steps to find the volume of the right circular cylinder. Step 1: Identify the radius and name it r; Identify its height and name it h. Step 2: Find the volume using the formula V = πr2h. Step 3: Represent the final answer with cubic units. Example: Find the volume of a cylinder of radius 3 units and height 7 units. Use π = 3.14. Solution: The radius of the cylinder is, r = 3 units. Its height is, h = 7 units. Its volume is calculated as: V = πr2h ⇒ V = (3.14) (3)2 (7) ⇒ V = 197.82 cubic units. Therefore, the volume of the given cylinder is 197.82 cubic units. Volume of a Right Circular Cylinder using Integration Formula For a right circular cylinder, if its height (h) and base radius (R) is given, then its volume using integration can be given as shown below. Consider a volume element as shown in the figure at right, which is at distance z from the center of the cylinder and has thickness dz. The volume of this element is equal to its base area times the thickness. Volume of element (dV) = Area of base of the element × Thickness = (πR2) dz Summing up the volume of all such elements will give us the volume of a cylinder. Therefore, the volume of a cylinder is equal to, Volume of the cylinder = Sum of all volumes of all such elements = Definite Integral of the volume of this element from z=0 to z=h Volume of a Right Circular Cylinder, V = \(\int_{z = 0}^{h} \pi R^2 \,dz = \pi R^2 \bigg[z \bigg]_0^h = \pi R^2 \bigg[h - 0 \bigg] = \pi R^2h \) Note: Volume of an oblique cylinder is same as that of volume of a right cylinder, but vertical height is taken instead of the cylinder's slant height. Example 1: The volume of a right circular cylinder is 7040 in3. If its radius is 4 in, find its height. Use π = 22/7. Solution: The volume of the cylinder is, V = 440 in3. Its radius is, r = 4 cm. Let us assume its height to be 'h' (in inches). Substitute these values in the formula to find the volume of the right circular cylinder: V = πr2h 7040 = 22 / 7 × 42 × h h = (7040 × 7)/ (22 × 16) h = 140 in Answer: Height of the given cylinder is 140 in. Example 2: Find the height of a can that can hold 1 gallon of oil. Its radius is 5 inches. Find its height and round off your answer to the nearest hundredth. Use π = 3.14. Solution: The volume of the can is, V = 1 gallon = 231 cubic inches. The radius of the can is, r = 5 inches. Let its height to be 'h' (in inches). Substitute these values in the formula to find the volume of the right circular cylinder: V = πr2h 231 = 3.14 × 52 × h h = 231 / (3.14 × 25) h ≈ 2.94 in (Rounded to nearest hundredth) Answer: Height of the given can is 2.94 inches. Show solution > go to slidego to slide How can your child master math concepts? Math mastery comes with practice and understanding the 'Why' behind the 'What.' Experience the Cuemath difference. Book a Free Trial Class FAQs on Volume of Right Circular Cylinder The volume (V) of a circular cylinder of radius r and height h is calculated using the formula V = π r2h. What Is the Volume of a Right Circular Cylinder of Base Radius 7 cm and Height 10 cm? The radius of the cylinder is, r = 7 cm. Its height is, h = 10 cm. Its volume is, V = πr2h ⇒V = (3.14) (7)2 (10) ⇒V = 1538.6 cm3. What Is the Difference Between the Cylinder and Right Circular Cylinder? A cylinder can be either an oblique or a right circular cylinder. In a right circular cylinder, the bases are parallel and congruent circles where each line segment of the lateral curved surface is perpendicular to the bases. An oblique cylinder is a cylinder that is not a right circular cylinder. What Is the Formula for Finding the Volume of a Right Circular Cylinder? The formula to find the volume of a right circular cylinder whose radius is r and height is h is, V = πr2h. i.e., the volume directly varies with the square of the radius, and also it directly varies with the height of the cylinder. How Do You Find the Volume of a Cylinder if Only Base Area and Height Is Given? The volume of a cylinder is the capacity of the cylinder which signifies the amount of any material it can hold or the amount of any material that can be immersed in it. From the definition, the volume of the cylinder = Base Area × Height What Is the Unit Used to Express Volume of a Cylinder? The volume of a cylinder is expressed in cubic units, like in3, cm3, m3, ft3, etc. Q1: Find the volume of a right circular cylinder whose radius is 7 units and height 14 units. $$(Use π as 22/7)$$.2100 cubic units2110 cubic units2150 cubic units2156 cubic unitsQ2: The volume of a juice can which is in the shape of a right circular cylinder is 880 cubic units. If the height of the can is 28 units, find its radius. $$(Use π as 22/7)$$2.16 units7.16 units5.16 units3.16 unitsQ3: The volume of a right circular cylinder is $$44 π$$ cubic units. If the radius of the cylinder is 2 units, find its height. $$(Use π as 22/7)$$7 units 8 units 9 units 11 unitsQ4: The diameter of a water bottle in the form of a right circular cylinder is 10 units and its height is 14 units. Find the volume of the water bottle.1000 cubic units1200 cubic units1300 cubic units1100 cubic unitsQ5: If the radius of a right circular cylinder is doubled and the height is halved, then the volume of the right circular cylinder will be:$$½ πr 2h$$$πr2h$$ $$4πr2h$$ $$2 πr2h $$ Published By: Calculator Academy Last Updated: June 10, 2025 Enter the radius of the circle (in) and the height of the circle (in) into the Circle Volume Calculator. The calculator will evaluate and display the Circle Volume. The following formula is used to calculate the Circle Volume. Where CV is the Circle Volume (in^3) R is the radius of the circle (in) H is the height of the circle (in) To calculate circle volume, square the radius, then multiply by pi times the height. The following example problems outline how to calculate Circle Volume. Example Problem #1: First, determine the radius of the circle (in). The radius of the circle (in) is given as: 4. Next, determine the height of the circle (in). The height of the circle (in) is provided as: 20. Finally, calculate the Circle Volume using the equation above: CV = pi*R^2*H The values given above are inserted into the equation below: CV = 3.14159*4^2*20 = 10005.308 (in^3) Example Problem #2: The variables needed for this problem are provided below: radius of the circle (in) = 6 height of the circle (in) = 3 Entering these values and solving gives: CV = 3.14159*6^2*3 = 339.29 (in^3) Calculator Change Log: 6/10/25 – Added functionality and clarity for calculating cylinder, sphere, and cone volumes. All which which may be considered "circles" in this context. You can use any consistent unit of length (meters, feet, inches, etc.). Remember that the volume result will be in cubic units of whatever length unit you used. For example, if you input measurements in meters, your result will be in cubic meters (m³). home / math / volume calculator The following is a list of volume calculators for several common shapes. Please fill in the corresponding fields and click the "Calculate" button. Sphere Volume Calculator Cone Volume Calculator Cube Volume Calculator Cylinder Volume Calculator Rectangular Tank Volume Calculator Capsule Volume Calculator Spherical Cap Volume Calculator Please provide any two values below to calculate. Conical Frustum Volume Calculator Ellipsoid Volume Calculator Square Pyramid Volume Calculator Tube Volume Calculator RelatedSurface Area Calculator | Area Calculator Volume is the quantification of the three-dimensional space a substance occupies. The SI unit for volume is the cubic meter, or m3. By convention, the volume of a container is typically its capacity, and how much fluid it is able to hold, rather than the amount of space that the actual container displaces. Volumes of many shapes can be calculated by using well-defined formulas. In some cases, more complicated shapes can be broken down into simpler aggregate shapes, and the sum of their volumes is used to determine total volume. The volumes of other even more complicated shapes can be calculated using integral calculus if a formula exists for the shape's boundary. Beyond this, shapes that cannot be described by known equations can be estimated using mathematical methods, such as the finite element method. Alternatively, if the density of a substance is known, and is uniform, the volume can be calculated using its weight. This calculator computes volumes for some of the most common simple shapes. Sphere A sphere is the three-dimensional counterpart of a two-dimensional circle. It is a perfectly round geometrical object that, mathematically, is the set of points that are equidistant from a given point at its center, where the distance between the center and any point on the sphere is the radius r. Likely the most commonly known spherical object is a perfectly round ball. Within mathematics, there is a distinction between a ball and a sphere, where a ball comprises the space bounded by a sphere. Regardless of this distinction, a ball and a sphere share the same radius, center, and diameter, and the calculation of their volumes is the same. As with a circle, the longest line segment that connects two points of a sphere through its center is called the diameter, d. The equation for calculating the volume of a sphere is provided below: EX: Claire wants to fill a perfectly spherical water balloon with radius 0.15 ft with vinegar to use in the water balloon fight against her arch-nemesis Hilda this coming weekend. The volume of vinegar necessary can be calculated using the equation provided below: volume = 4/3 × π × 0.153 = 0.141 ft3 Cone A cone is a three-dimensional shape that tapers smoothly from its typically circular base to a common point called the apex (or vertex). Mathematically, a cone is formed similarly to a circle, by a set of line segments connected to a common center point, except that the center point is not included in the plane that contains the circle (or some other base). Only the case of a finite right circular cone is considered on this page. Cones comprised of half-lines, non-circular bases, etc. that extend infinitely will not be addressed. The equation for calculating the volume of a cone is as follows: where r is the radius and h is the height of the cone EX: Bea is determined to walk out of the ice cream store with her hard-earned $5 well spent. While she has a preference for regular sugar cones, the waffle cones are indisputably larger. She determines that she has a 15% preference for regular sugar cones over waffle cones and needs to determine whether the potential volume of the waffle cone is ≥ 15% more than that of the sugar cone. The volume of the waffle cone with a circular base with radius 1.5 in and height 5 in can be computed using the equation below: volume = 1/3 × π × 1.52 × 5 = 11.781 in3 Bea also calculates the volume of the sugar cone and finds that the difference is < 15%, and decides to purchase a sugar cone. Now all she has to do is use her angelic, childlike appeal to manipulate the staff into emptying the containers of ice cream into her cone. Cube A cube is the three-dimensional analog of a square, and is an object bounded by six square faces, three of which meet at each of its vertices, and all of which are perpendicular to their respective adjacent faces. The cube is a special case of many classifications of shapes in geometry, including being a square parallelepiped, an equilateral cuboid, and a right rhombohedron. Below is the equation for calculating the volume of a cube: volume = a3 where a is the edge length of the cube EX: Bob, who was born in Wyoming (and has never left the state), recently visited his ancestral homeland of Nebraska. Overwhelmed by the magnificence of Nebraska and the environment unlike any other he had previously experienced, Bob knew that he had to bring some of Nebraska home with him. Bob has a cubic suitcase with edge lengths of 2 feet, and calculates the volume of soil that he can carry home with him as follows: volume = 23 = 8 ft3 Cylinder A cylinder in its simplest form is defined as the surface formed by points at a fixed distance from a given straight line axis. In common use, however, "cylinder" refers to a right circular cylinder, where the bases of the cylinder are circles connected through their centers by an axis perpendicular to the planes of its bases, with given height h and radius r. The equation for calculating the volume of a cylinder is shown below: volume = πr2h where r is the radius and h is the height of the tank EX: Caelum wants to build a sandcastle in the living room of his house. Because he is a firm advocate of recycling, he has recovered three cylindrical barrels from an illegal dumping site and has cleaned the chemical waste from the barrels using dishwashing detergent and water. The barrels each have a radius of 3 ft and a height of 4 ft, and Caelum determines the volume of sand that each can hold using the equation below: volume = π × 32 × 4 = 113.097 ft3 He successfully builds a sandcastle in his house, and as an added bonus, manages to save electricity on nighttime lighting, since his sandcastle glows bright green in the dark. Rectangular Tank A rectangular tank is a generalized form of a cube, where the sides can have varying lengths. It is bounded by six faces, three of which meet at its vertices, and all of which are perpendicular to their respective adjacent faces. The equation for calculating the volume of a rectangle is shown below: volume= length × width × height EX: Darby likes cake. She goes to the gym for 4 hours a day, every day, to compensate for her love of cake. She plans to hike the Kalalau Trail in Kauai and though extremely fit, Darby worries about her ability to complete the trail due to her lack of cake. She decides to pack only the essentials and wants to stuff her perfectly rectangular pack of length, width, and height 4 ft, 3 ft and 2 ft respectively, with cake. The exact volume of cake she can fit into her pack is calculated below: volume = 2 × 3 × 4 = 24 ft3 Capsule A capsule is a three-dimensional geometric shape comprised of a cylinder and two hemispherical ends, where a hemisphere is half a sphere. It follows that the volume of a capsule can be calculated by combining the volume equations for a sphere and a right circular cylinder: volume = πr2h + πr3 = πr2(r + h) where r is the radius and h is the height of the cylindrical portion EX: Given a capsule with a radius of 1.5 ft and a height of 3 ft, determine the volume of melted milk chocolate m&m's that Joe can carry in the time capsule he wants to bury for future generations on his journey of self-discovery through the Himalayas: volume = π × 1.52 × 3 + 4/3 ×π ×1.53 = 35.343 ft3 Spherical Cap A spherical cap is a portion of a sphere that is separated from the rest of the sphere by a plane. If the plane passes through the center of the sphere, the spherical cap is referred to as a hemisphere. Other distinctions exist, including a spherical segment, where a sphere is segmented with two parallel planes and two different radii where the planes pass through the sphere. The equation for calculating the volume of a spherical cap is derived from that of a spherical segment, where the second radius is 0. In reference to the spherical cap shown in the calculator: Given two values, the calculator provided computes the third value and the volume. The equations for converting between the height and the radii are shown below: Given r and R: h = R ± √R2 - r2 Given r and h: R = Given R and h: r = √2Rh - h2 where r is the radius of the base, R is the radius of the sphere, and h is the height of the spherical cap EX: Jack really wants to beat his friend James in a game of golf to impress Jill, and rather than practicing, he decides to sabotage James' golf ball. He cuts off a perfect spherical cap from the top of James' golf ball, and needs to calculate the volume of the material necessary to replace the spherical cap and skew the weight of James' golf ball. Given James' golf ball has a radius of 1.68 inches, and the height of the spherical cap that Jack cut off is 0.3 inches, the volume can be calculated as follows: volume = 1/3 × π × 0.32 (3 × 1.68 - 0.3) = 0.447 in3 Unfortunately for Jack, James happened to receive a new shipment of balls the day before their game, and all of Jack's efforts were in vain. Conical Frustum A conical frustum is the portion of a solid that remains when a cone is cut by two parallel planes. This calculator calculates the volume for a right circular cone specifically. Typical conical frustums found in everyday life include lampshades, buckets, and some drinking glasses. The volume of a right conical frustum is calculated using the following equation: volume = πh(r2 + rR + R2) where r and R are the radii of the bases, h is the height of the frustum EX: Bea has successfully acquired some ice cream in a sugar cone, and has just eaten it in a way that leaves the ice cream packed within the cone, and the ice cream surface level and parallel to the plane of the cone's opening. She is about to start eating her cone and the remaining ice cream when her brother grabs her cone and bites off a section of the bottom of her cone that is perfectly parallel to the previously sole opening. Bea is now left with a right conical frustum leaking ice cream, and has to calculate the volume of ice cream she must quickly consume given a frustum height of 4 inches, with radii 1.5 inches and 0.2 inches: volume=1/3 × π × 4(0.22 + 0.2 × 1.5 + 1.52) = 10.849 in3 Ellipsoid An ellipsoid is the three-dimensional counterpart of an ellipse, and is a surface that can be described as the deformation of a sphere through scaling of directional elements. The center of an ellipsoid is the point at which three pairwise perpendicular axes of symmetry intersect, and the line segments delimiting these axes of symmetry are called the principal axes. If all three have different lengths, the ellipsoid is commonly described as tri-axial. The equation for calculating the volume of an ellipsoid is as follows: where a, b, and c are the lengths of the axes EX: Xabat only likes eating meat, but his mother insists that he consumes too much, and only allows him to eat as much meat as he can fit within an ellipsoid shaped bun. As such, Xabat hollows out the bun to maximize the volume of meat that he can fit in his sandwich. Given that his bun has axis lengths of 1.5 inches, 2 inches, and 5 inches, Xabat calculates the volume of meat he can fit in each hollowed bun as follows: volume = 4/3 × π × 1.5 × 2 × 5 = 62.832 in3 Square Pyramid A pyramid in geometry is a three-dimensional solid formed by connecting a polygonal base to a point called its apex, where a polygon is a shape in a plane bounded by a finite number of straight line segments. There are many possible polygonal bases for a pyramid, but a square pyramid is a pyramid in which the base is a square. Another distinction involving pyramids involves the location of the apex. A right pyramid has an apex that is directly above the centroid of its base. Regardless of where the apex of the pyramid is, as long as its height is measured as the perpendicular distance from the plane containing the base to its apex, the volume of the pyramid can be written as: Generalized pyramid volume: where b is the area of the base and h is the height Square pyramid volume: where a is the length of the base's edge EX: Wan is fascinated by ancient Egypt and particularly enjoys anything related to the pyramids. Being the eldest of his siblings Too, Tree and Fore, he is able to easily corral and deploy them at his will. Taking advantage of this, Wan decides to re-enact ancient Egyptian times and have his siblings act as workers building him a pyramid of mud with edge length 5 feet and height 12 feet, the volume of which can be calculated using the equation for a square pyramid: volume = 1/3 × 52 × 12 = 100 ft3 Tube Pyramid A tube, often also referred to as a pipe, is a hollow cylinder that is often used to transfer fluids or gas. Calculating the volume of a tube essentially involves the same formula as a cylinder (volume=pr2h), except that in this case, the diameter is used rather than the radius, and length is used rather than height. The formula, therefore, involves measuring the diameters of the inner and outer cylinder, as shown in the figure above, calculating each of their volumes, and subtracting the volume of the inner cylinder from that of the outer one. Considering the use of length and diameter mentioned above, the formula for calculating the volume of a tube is shown below: where d1 is the outer diameter, d2 is the inner diameter, and l is the length of the tube EX: Beulah is dedicated to environmental conservation. Her construction company uses only the most environmentally friendly of materials. She also prides herself on meeting customer needs. One of her customers has a vacation home built in the woods, across a creek. He wants easier access to his house, and requests that Beulah build him a road, while ensuring that the creek can flow freely so as not to disrupt his favorite fishing spot. She decides that the pesky beaver dams would be a good point to build a pipe through the creek. The volume of patented low-impact concrete required to build a pipe of outer diameter 3 feet, inner diameter 2.5 feet, and length of 10 feet, can be calculated as follows: volume = π × × l0 = 21.6 ft3 Common Volume Units To determine the volume of a circle-shaped cylinder, multiply π by the square of the radius (R) and then by the height (H). This calculation applies to any circle-based solid structure. READ ALSO : Cm To Degrees Calculator The Circle Volume Calculator allows you to calculate the volume of a circle-shaped cylinder. Commonly, that shape is seen in tanks, pipes, and circular columns. This measurement is critical in engineering, construction, and manufacturing, where understanding the space a cylindrical shape can hold is essential. By using the radius of the circle and the height of the cylinder, you can accurately find the volume in cubic units. This tool is ideal for converting cylindrical dimensions into an easily interpretable volume figure for various practical applications. Formula: CV=pi*R2* Variable Description CV Circle Volume π Pi, approximately 3.14159 R Radius of the circle H Height of the cylinder Solved Calculations: Example 1:Find the volume of a cylinder with a radius of 5 units and a height of 10 units. Step Calculation 1 CV = π * 5^2 * 10 2 CV = π * 25 * 10 3 CV = 785.4 cubic units Answer: 785.4 cubic units Example 2:Calculate the volume for a cylinder with a radius of 7 units and height of 15 units. READ ALSO : Karmic Number Calculator Step Calculation 1 CV = π * 7^2 * 15 2 CV = π * 49 * 15 3 CV = 2309.2 cubic units Answer: 2309.2 cubic units What is a Circle Volume Calculator? A Circle Volume Calculator is a type of calculator that primarily serves to calculate the volume for shapes that have a circular base, such as cylinders or spheres. While circles themselves are two-dimensional and don't have volume, three-dimensional shapes derived from circles—like cylinders and spheres—do. In case you are to calculate the volume of a cylinder, you'd need to find the area of the circle and multiply it by the cylinder's height. Moreover, for a circular tank or pipe, enter the radius and height to determine how much space it contains, often measured in liters or cubic meters. It should be noted that this tool is also used in real-life applications, like determining the volume of a pond or pool. No doubt, this calculator is a versatile tool for both simple tasks, like finding the volume of a water tank, and more complex uses, such as calculating the storage volume of circular silos. READ ALSO : R-R Interval Heart Rate CalculatorFinal Words: At long last, using a Circle Volume Calculator can simplify volume calculations for structures with circular bases, ensuring precise measurements for various practical applications, from construction to everyday uses. Get a Widget for this Calculator h = height s = slant height a = side length e = lateral edge length r = a/2 V = volume L = lateral surface area B = base surface area S = total surface area Hanna Pamuła, PhDHanna PamułaPhDHanna (Hania) Pamuła holds a Ph.D. in Bioacoustics / Mechanical Engineering, obtained at AGH University of Science and Technology. She has participated in research work in labs in France and the UK and presented papers at several international conferences. Hania has a penchant for photography and graphic design. When not in the office, she's probably traveling, hiking, or out in the field, watching birds and recording their calls. See full profileCheck our editorial policyBogna Szyk, Jack Bowater, and Borys Kuca, PhDBorys KucaPhD, Jagiellonian University, Cracow, PolandA mathematician at the Jagiellonian University in Cracow, Poland, fascinated with patterns in numbers. Always keen to know more, read more, and see more, he has turned learning into a way of life. When he is not busy proving new theorems, you can find him discussing books with friends, hiking nearby mountains, or sipping green tea. He never refuses dark chocolate with chili – the spicier, the merrier. See full profileCheck our editorial policy3 623 people find this calculator helpfulTable of contentsOur cylinder volume calculator can help you calculate the volume of that solid. Whether you want to figure out how much water fits in a can, coffee in your favorite mug, or even the volume of a drinking straw — you're in the right place. The other option is calculating the volume of a cylindrical shell (hollow cylinder).Let's start from the beginning — what is a cylinder? It's a solid bounded by a cylindrical surface and two parallel planes. We can imagine it as a solid physical tin with lids on top and bottom. To calculate its volume, we need to know two parameters — the radius (or diameter) and height: cylinder volume = π × cylinder radius² × cylinder height The cylinder volume calculator helps in finding the volume of right, hollow, and oblique cylinders:The hollow cylinder, also called the cylindrical shell, is a cylinder from which someone has cut out a smaller cylinder in such a way that the same vertical axis passes through the center of both. Think of a drinking straw or a pipe. The formula behind the volume of a hollow cylinder is: cylinder volume = π × (R² - r²) × cylinder height where: R — external radius; and r — internal radius. Similarly, we can calculate the cylinder volume using the external diameter, D, and internal diameter, d, of a hollow cylinder with this formula: cylinder volume = π × [(D² - d²)/4] × cylinder height To calculate the volume of a cylindrical shell, let's take some real-life examples, maybe... a roll of toilet paper, because why not? 😀 Enter the external diameter of the cylinder. Typically, it is approximately 11 cm. Determine the internal cylinder diameter. It's the internal diameter of the cardboard part, around 4 cm. Find out what's the height of the cylinder; for us, it's 9 cm. Tadaaam! The volume of a hollow cylinder is equal to 742.2 cm³. Remember that the result is the volume of the paper and the cardboard. If you want to calculate how much plasticine you can put inside the cardboard roll, use the standard formula for the volume of a cylinder — the calculator will calculate it in the blink of an eye!The oblique (or slanted) cylinder is the one that 'leans over' — the sides are not perpendicular to the bases in contrast to a standard 'right cylinder'. How to calculate the volume of an oblique cylinder? The formula is the same as for the straight one. Just remember that the height must be perpendicular to the bases. Now that you know how to calculate the volume of a cylinder, maybe you want to determine the volumes of other 3D solids? Use this general volume calculator! If you are curious about how many teaspoons or cups fit into your container, use our volume converter. To calculate the volume of soil needed for flower pots of different shapes — also for the cylindrical one — use the potting soil calculator.Cylinders are all around us, and we are not just talking about Pringles' cans. Although things in nature are rarely perfect cylinders, some examples of approximate cylinders are tree trunks & plant stems