

Volume of:

Prisms and Cylinders

Pyramids and Cones

Spheres

Volume of Prisms and Cylinders

- * The volume V of a prism is $V = Bh$, where B is the area of a base and h is the height of the prism.

$$B = \frac{1}{2}Pa$$

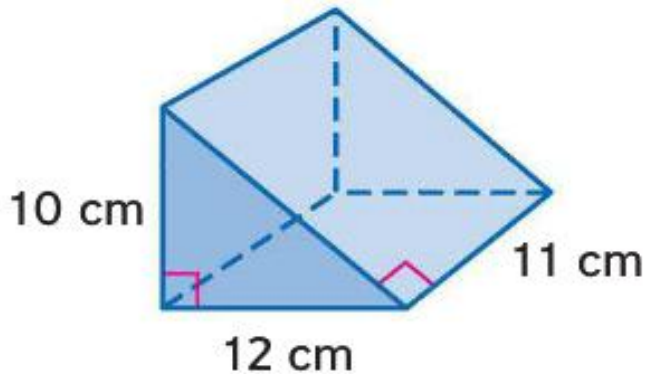
P = perimeter

a = apothem



Examples

- * Find the volume of the prism.

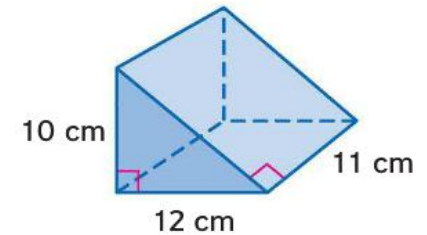


$$A = \frac{bh}{2} = \frac{12 \cdot 10}{2} = \underline{60 = B}$$

$$V = Bh \\ = 60 \cdot 11 = 660$$

Examples

- * Find the volume of the prism.

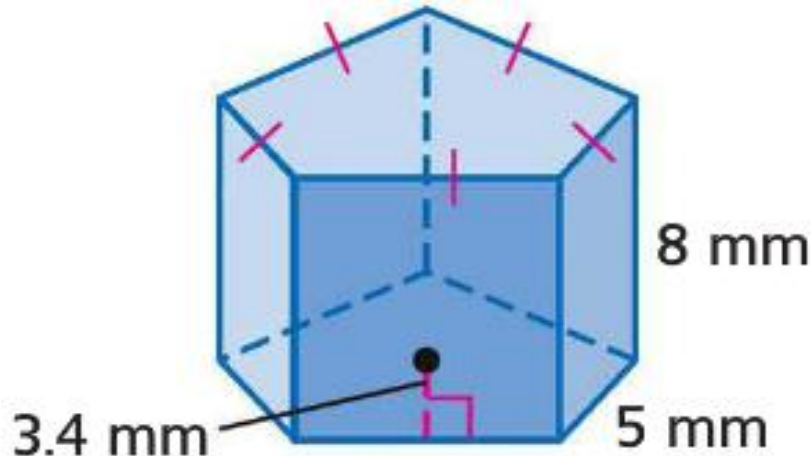


- * $V = Bh$; $B = \frac{1}{2}bh = \frac{1}{2}(10)(12) = 60$; $h = 11$
- * $V = 60 * 11 = 660$

Examples

$$V = Bh$$
$$= (42.5)(8)$$

- * Find the volume of the prism. $= 340$



$$A = \frac{1}{2}Pa$$
$$= \frac{1}{2}(25)(3.4)$$
$$= 42.5$$

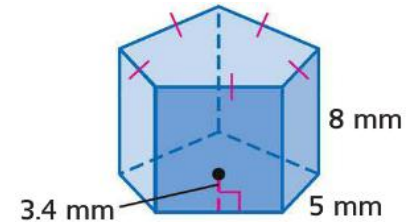
Examples

* Find the volume of the prism.

* $V = Bh$

* $B = \frac{1}{2}Pa = \frac{1}{2}(5 * 5)(3.4) = 42.5$

* $V = (42.5)(8) = 340$

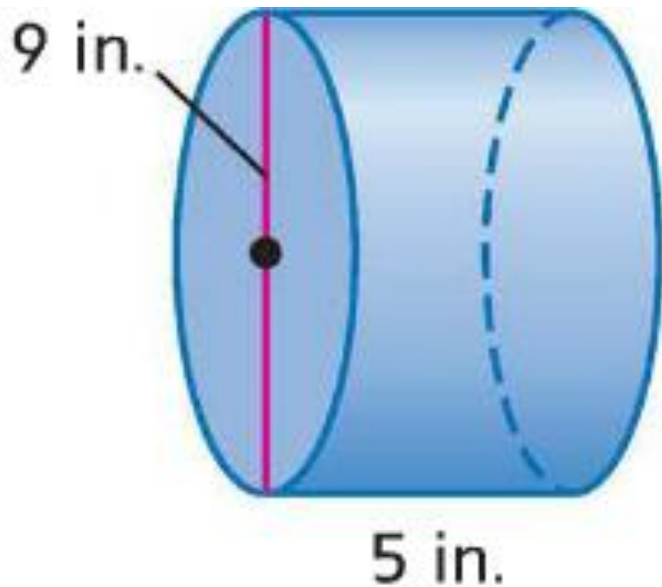


Volume of a Cylinder

- * The volume V of a cylinder is $V = Bh$ or $V = \pi r^2 h$, where B is the area of the base, h is the height of the cylinder, and r is the radius of the base.

Examples

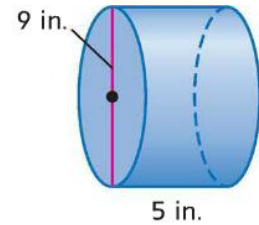
- * Find the volume of the cylinder.



$$\begin{aligned} V &= \pi r^2 h \\ &= \pi (4.5)^2 (5) \\ &= 101.25\pi \end{aligned}$$

Examples

* Find the volume of the cylinder.



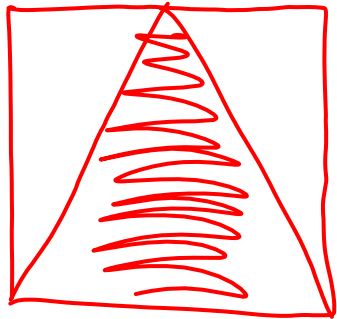
* $V = \pi r^2 h; h = 5$

* $r = \frac{9}{2} = 4.5$

* $V = \pi(4.5^2)(5) = 101.25\pi = 318.1$

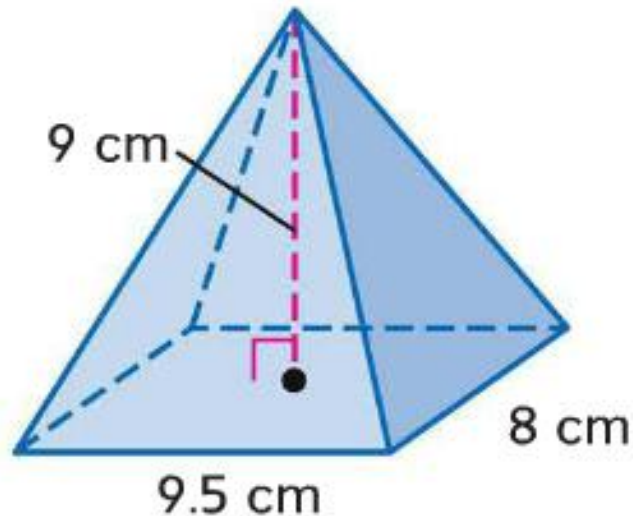
Volume of a Pyramid

- * The volume of a pyramid is $V = \frac{1}{3}Bh$, where B is the area of the base and h is the height of the pyramid.



Examples

- * Find the volume of the pyramid.



$$\begin{aligned} V &= \frac{1}{3} Bh \\ &= \frac{1}{3} bh h \\ &= \frac{1}{3} lwh \\ &= \frac{1}{3} (9.5)(8)(9) \\ &= 228 \end{aligned}$$

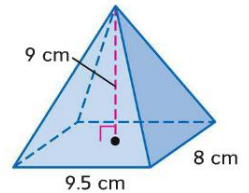
Examples

* Find the volume of the pyramid.

* $V = \frac{1}{3}Bh$

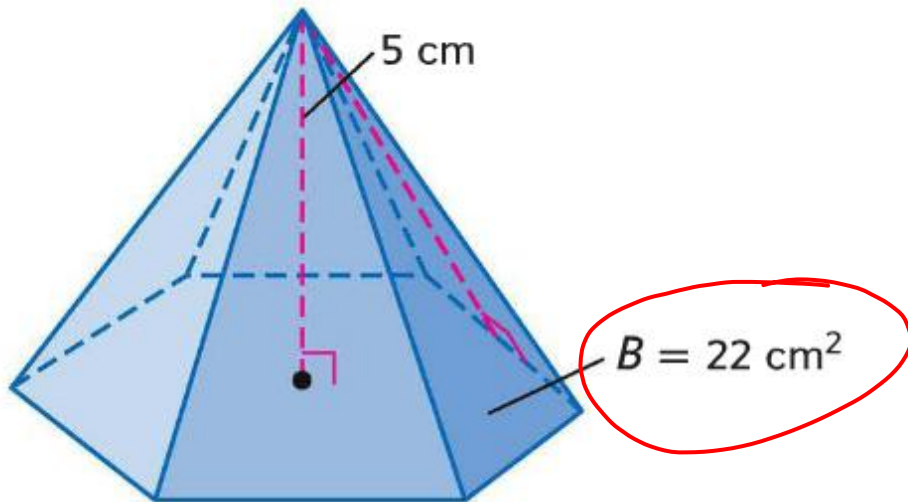
* $B = 9.5 * 8 = 76; h = 9$

* $V = \frac{1}{3}(76)(9) = 228$



Examples

- * Find the volume of the pyramid.



$$\begin{aligned} V &= \frac{1}{3} B h \\ &= \frac{1}{3} (22) (5) \\ &= 36.67 \end{aligned}$$

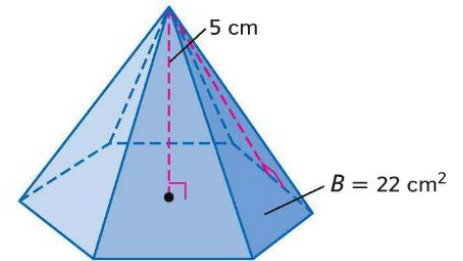
Examples

* Find the volume of the pyramid.

* $V = \frac{1}{3}Bh$

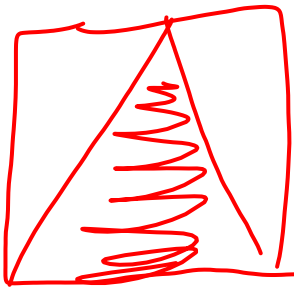
* $B = 22; h = 5$

* $V = \frac{1}{3}(22)(5) = 36.67$



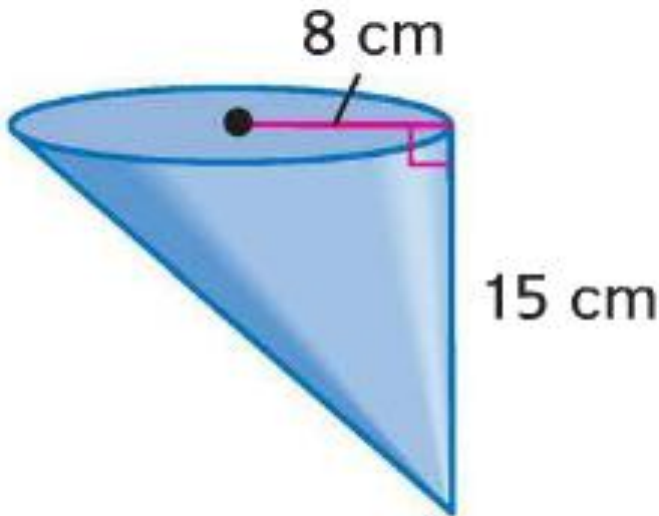
Volume of a Cone

- * The volume of a circular right cone is $V = \frac{1}{3}Bh$, or $V = \frac{1}{3}\pi r^2 h$, where B is the area of the base, h is the height of the cone, and r is the radius of the base.



Examples

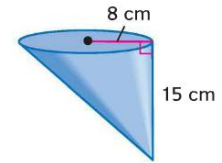
- * Find the volume of the cone. Round to the nearest tenth.



$$\begin{aligned} V &= \frac{1}{3} \pi r^2 h \\ &= \frac{1}{3} \pi (8)^2 (15) \\ &= 320\pi \\ &= 1005.3 \end{aligned}$$

Examples

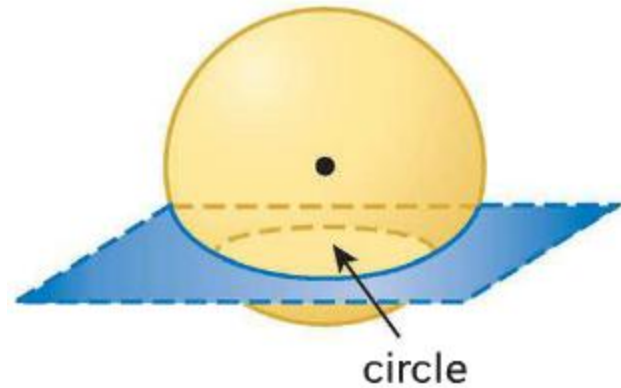
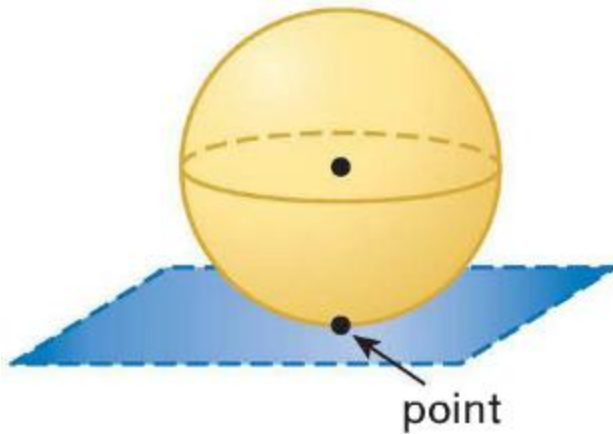
- * Find the volume of the cone. Round to the nearest tenth.



- * $V = \frac{1}{3}\pi r^2 h; r = 8, h = 15$
- * $V = \frac{1}{3}\pi(8^2)(15) = 320\pi = 1005.3$

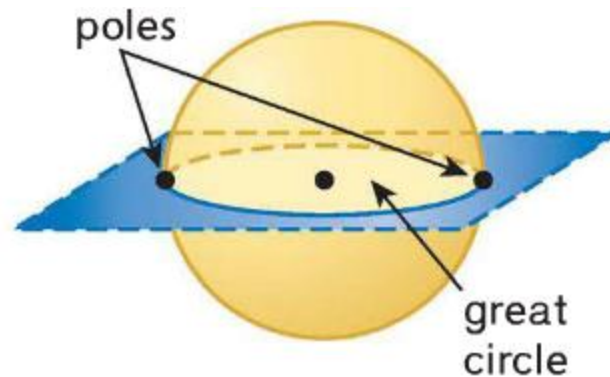
Spheres

- * A plane can intersect a sphere in a point or in a circle.



Spheres

- * If the circle contains the center of the sphere, the intersection is called a great circle.
- * The endpoints of a diameter of a great circle are called poles.



Great Circle

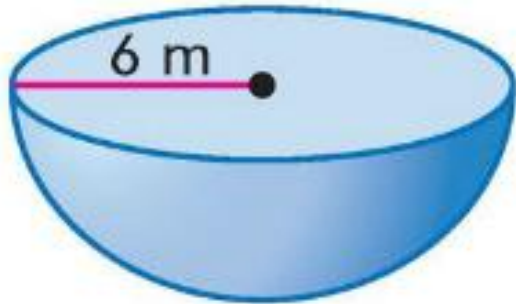
- * Since a great circle has the same center as the sphere and its radii are also radii of the sphere, it is the largest circle that can be drawn on a sphere.
- * It separates a sphere into two congruent halves, called hemispheres.

Volume of a Sphere

- * The volume V of a sphere is $V = \frac{4}{3}\pi r^3$, where r is the radius of the sphere.

Examples

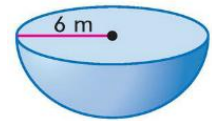
- * Find the volume of the sphere or hemisphere. Round to the nearest tenth.



$$\begin{aligned} V &= \frac{2}{3} \pi r^3 \\ &= \frac{2}{3} \pi (6)^3 \\ &= \frac{432\pi}{3} \\ &= 456.6 \end{aligned}$$

Examples

- * Find the volume of the sphere or hemisphere. Round to the nearest tenth.



- * $V = \frac{4}{3}\pi r^3; r = 6$
- * $V = \frac{4}{3}\pi 6^3 = \frac{4}{3}\pi(216)$
- * $V = 288\pi = 904.8$

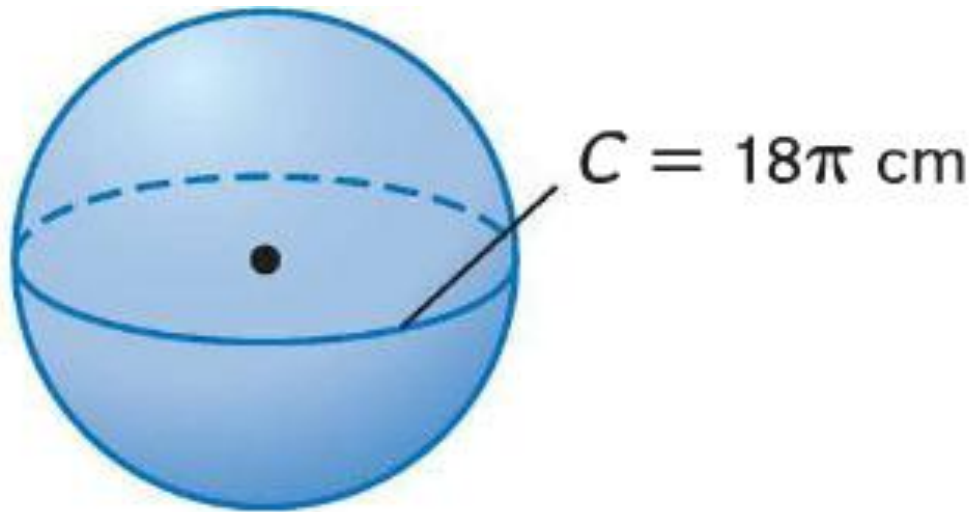
Examples

$$\frac{C}{2\pi} = \frac{2\pi r}{2\pi}$$

$$\frac{18\pi}{2\pi} = r$$

$$9 = r$$

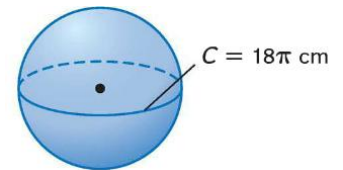
- * Find the volume of the sphere or hemisphere. Round to the nearest tenth.



$$\begin{aligned} V &= \frac{4}{3}\pi r^3 \\ &= \frac{4}{3}\pi (9)^3 \\ &= 3053.6 \end{aligned}$$

Examples

- * Find the volume of the sphere or hemisphere. Round to the nearest tenth.



- * $V = \frac{4}{3}\pi r^3$

- * $C = 2\pi r; 18\pi = 2\pi r \rightarrow r = 9$

- * $V = \frac{4}{3}\pi 9^3 = \frac{4}{3}\pi(729) = 972\pi = 3053.6$