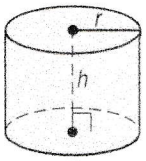
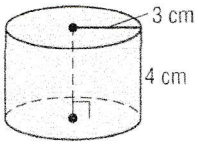
Volumes of Cylinders

Volumes of Cylinders The volume of a cylinder is the product of the height and the area of the base. When a solid is not a right solid, use Cavalieri's Principle to find the volume. The principle states that if two solids have the same height and the same cross sectional area at every level, then they have the same volume.



Volume of a Cylinder	If a cylinder has a volume of V cubic units, a height of h units, and the bases have a radius of r units, then $V = \pi r^2 h$.

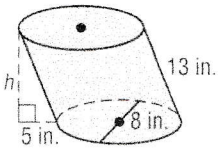
Example 1: Find the volume of the cylinder.



$V = \pi r^2 h$	Volume of a cylinder
$= \pi(3)^2(4)$	$r = 3$, $h = 4$
≈ 113.1	Simplify.

The volume is about 113.1 cubic centimeters.

Example 2: Find the volume of the oblique cylinder.



Use the Pythagorean Theorem to find the height of the cylinder.

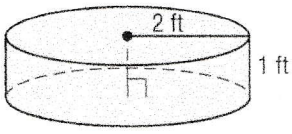
$h^2 + 5^2 = 13^2$	Pythagorean Theorem
$h^2 = 144$	Simplify.
$h = 12$	Take the positive square root of each side.
$V = \pi r^2 h$	Volume of a cylinder
$= \pi(4)^2(12)$	$r = 4$, $h = 12$
≈ 603.2	Simplify.

The volume is about 603.2 cubic inches.

Exercises

Find the volume of each cylinder. Round to the nearest hundredth. Ignore the dotted diagonal lines.

1.



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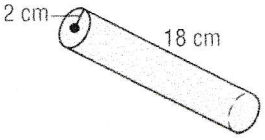
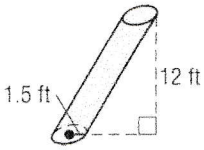


$V = \pi 2^2 \cdot 18$

$= 226.08 \text{ cm}^3$

3.



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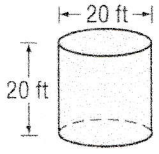
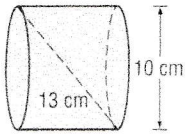


$r = 10 \text{ ft}$ $V = \pi 10^2 \cdot 20$

6280 ft^3

5.



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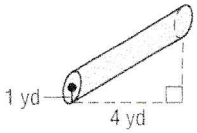
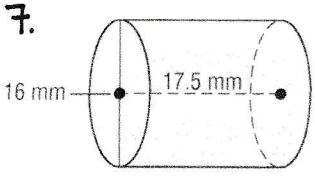


$V = \pi \cdot 1^2 \cdot 4$

$= 12.56 \text{ yd}^3$

7.



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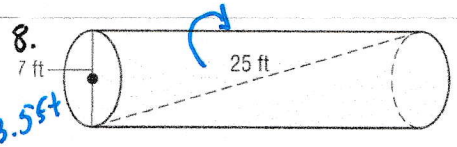

$r = 3.5 \text{ ft}$

$V = \pi \cdot 3.5^2 \cdot 25$

$= 961.63 \text{ ft}^3$