Cylinders

To find the volume of a cylinder, you can also use the following formula.

$$V = \pi r^2 h$$ where $\pi \approx 3.14$

r = radius

h = height

▷ Example

What is the volume of this cylinder?

r = 2 in.

h = 5 in.
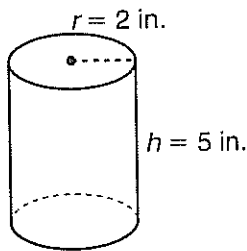
Use the following formula.

$$V = \pi r^2 h$$

$=$

$=$

$=$

The volume of this cylinder is

⬭ Practice

1. What is the volume of this cylinder?

$d = 40$ mm

$h = 120$ mm

PEAS

$V = $ _____
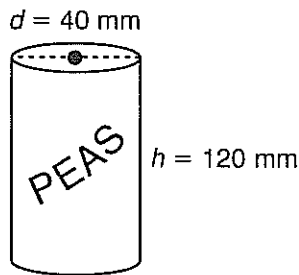
2. What is the volume of this cylinder?

$r = 8$ in.

18 in.

$V = $ _____
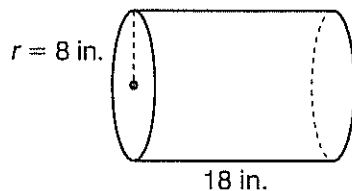
3. What is the volume of a cylinder that has a radius of 12 inches and a height of 4 inches?

$V = $ _____

4. What is the volume of a cylinder that has a diameter of 3 feet and a height of 4 feet?

$V = $ _____

5. What is the volume of a cylinder with a diameter of 18 centimeters and a height of 15 centimeters?

A. 15,268.14 cm^3

B. 12,723.45 cm^3

C. 3,815.10 cm^3

D. 3,180.86 cm^3

6. What is the volume of a cylinder with a height of 7.5 yards and a radius of 9.3 yards?

A. 509.47 yd^3

B. 1,643.45 yd^3

C. 2,036.84 yd^3

D. 8,151.49 yd^3

Formula for Volume of a Cylinder

To find the volume of a cylinder, you can use a formula.

The formula $V = \pi r^2 h$ means the volume of a cylinder equals pi times the radius squared times the height.

Remember, diameter $= 2r$.

EXAMPLE

Find the volume of this cylinder.

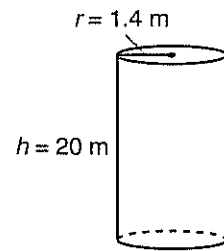|		
Write the formula.	$V = \pi r^2 h$	
Substitute the data.	$V = 3.14 \ (1.4 \times 1.4) \times 20$	
Solve the problem.	$V = 123.088$	

The volume of the cylinder is 123.088 cubic meters.

Remember, write your answer in cubic units.

$r = 1.4$ m

$h = 20$ m

PRACTICE

Use the formula for volume of a cylinder. Solve.

1. A cylindrical water tank has a diameter of 2.8 yards and is 6.5 yards high. What is the volume of the tank? Round your answer to the nearest hundredth.

   Answer _____

2. The inside radius of a pipe is 0.35 meters. One section of the pipe is 6 meters long. How much water will this piece of pipe hold?

   Answer _____

3. A small pipe has a radius of 1 inch and is 3.5 inches long. How much liquid can the pipe hold?

   Answer _____

4. A storage tank has a radius of 5.25 meters and a height of 12 meters. How much liquid can the storage tank hold? Round your answer to the nearest hundredth.

   Answer _____

5. The tank of a gasoline truck has a radius of 1.75 meters and is 7 meters long. What is the volume of the tank? Round your answer to the nearest hundredth.

   Answer _____

6. A cylinder-shaped container is 9 centimeters in diameter and 15 centimeters in height. How much liquid will this container hold? Round your answer to the nearest hundredth.

   Answer _____

The Slope Formula

Slope is the ratio of rise to run from one point to another point on a line. If you know two points on a line, you can find its slope by using a formula.

Slope Formula

If (x_1, y_1) and (x_2, y_2) are any two points on a line, then the slope of the line is given by:

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x} = \frac{(y_2 - y_1)}{(x_2 - x_1)}$$

EXAMPLE

Find the slope of the line.

Write the formula.

$$slope = \frac{(y_2 - y_1)}{(x_2 - x_1)}$$
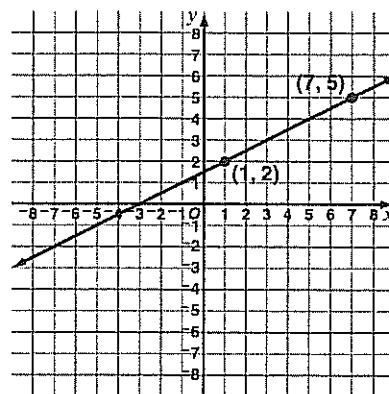
Substitute the coordinates.
Use (7, 5) and (1, 2).

$$slope = \frac{(5 - 2)}{(7 - 1)}$$

Simplify.

$$slope = \frac{3}{6} = \frac{1}{2}$$

The slope of this line is $\frac{1}{2}$.

PRACTICE

Find the slope of each line that passes through the given points.

a	b	c
1. ($^-$2, 4), (4, 2)	(3, 5), (4, 7)	(6, 2), (8, 0)
$\frac{(2 - 4)}{(4 - \,^-2)} = \frac{^-2}{6} = \frac{^-1}{3}$		
2. ($^-$2, $^-$2), (1, 4)	($^-$5, 3), (7, $^-$6)	($^-$3, 2), (1, 4)
3. (1, 1), ($^-$4, 7)	(0, $^-$2), (9, 3)	(1, 1), (4, 10)