

Day 14:
3D Shapes



COMUNIDADES LATINAS
UNIDAS EN SERVICIO



CONGRATULATIONS GED STUDENTS!

YOU MADE IT TO THE LAST DAY!

LAST DAY OF ENGLISH CLASSES: Friday, April 23rd

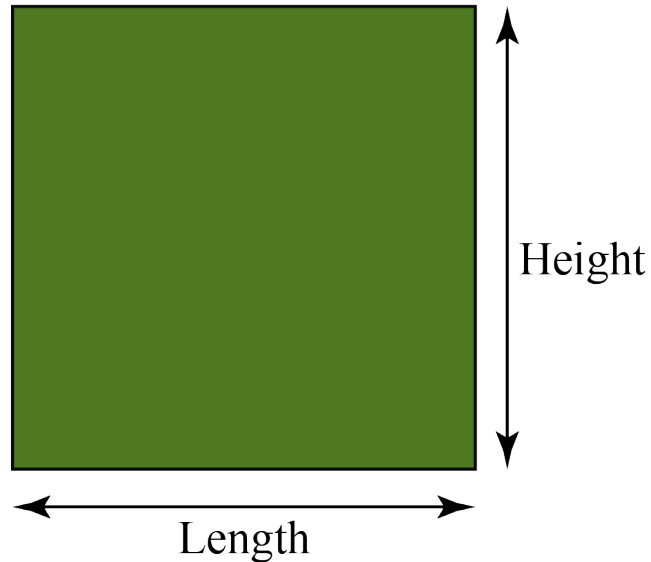
- Summer Science GED classes start: Monday, May 17th
- No English test needed to start
- Current students do not need to register again

Have a nice break!

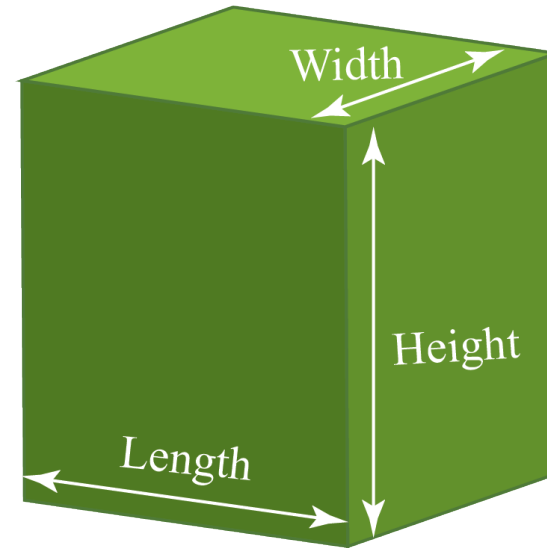


What's the difference between 2D and 3D shapes?


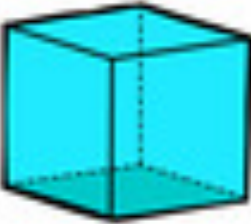





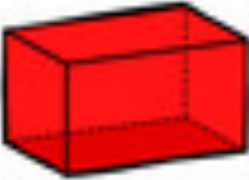






2D Shapes



3D Shapes



What 3D shapes can you think of?

cone 	cube 	cylinder 	hemisphere 
hexagonal prism 	octagonal prism 	pentagonal prism 	rectangular prism 
triangular prism 	hexagonal pyramid 	pentagonal pyramid 	square pyramid 
triangular pyramid 	sphere 		

Prisms

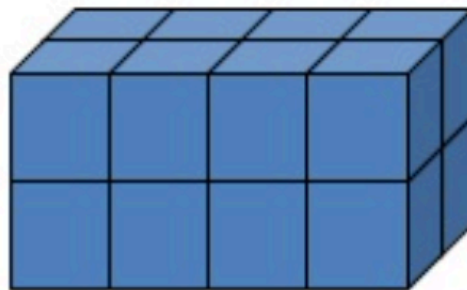


Volume of Prisms

The Volume of a 3D Shape is the number of cubes needed to fill the inside of the shape.



How many 1cm^3 cubes will fill the Rectangular prism ?



Sixteen 1cm^3 cubes ✓

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Volume of Prisms

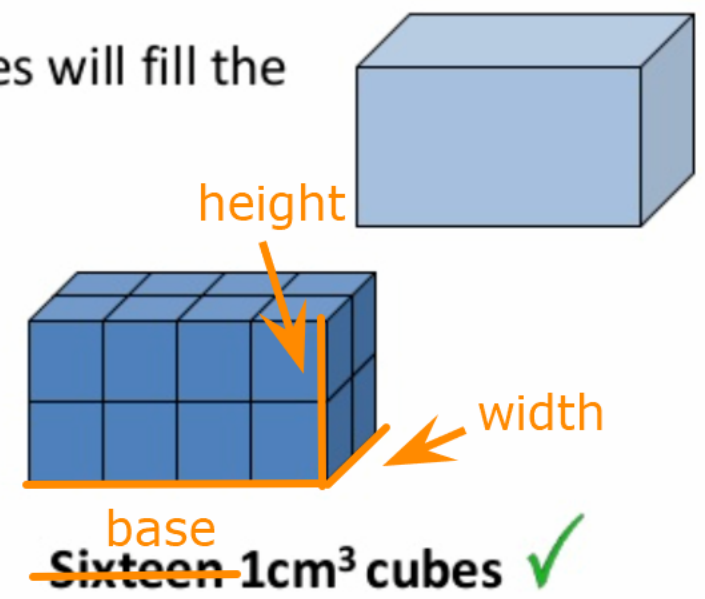
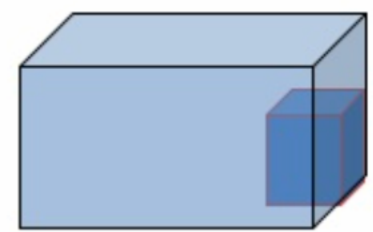


The Volume of a 3D Shape is the number of cubes needed to fill the inside of the shape.

Area = base * height
Volume = base * height * width



How many 1cm³ cubes will fill the Rectangular prism ?



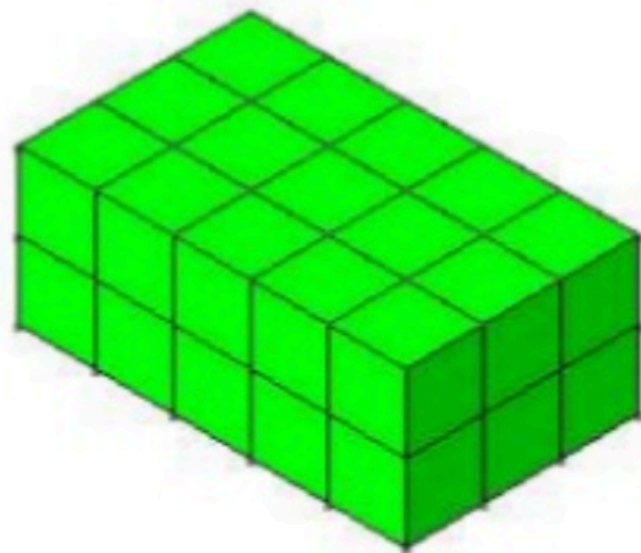
- 7 Two Layer Prism
How many cubes does this Prism hold?
Rather than count all the cubes, we can find the volume of this prism by counting how many cubes long, wide, and tall the prism is, and then Multiplying.
 $V = 5 \times 2 \times 2 = 20$
There are 20 cubes in the prism, which means the volume of the Rectangular Prism is 20 cubic units.
- 8 Three Layer Prism
How many cubes does this Prism hold?
Rather than count all the cubes, we can find the volume of this prism by counting how many cubes long, wide, and tall the prism is, and then Multiplying.
 $V = 5 \times 4 \times 3 = 72$
There are 72 cubes in the prism, which means the volume of the Rectangular Prism is 72 cubic units.
- 9 Volume of Rectangular Prism
 $4 \text{ cm} \times 3 \text{ cm} \times 1 \text{ cm} = 12 \text{ cm}^3$
 $\text{Length} \times \text{Width} \times \text{Height} = \text{Volume}$
 $\text{Area of Base} \times \text{Height} = \text{Volume}$
For any Rectangular prism, the Volume is found by multiplying the Area of its base times its height.
 $V = \text{Area} \times \text{Height}$
 $V = L \times W \times H$
- 10 Volume of Rectangular Prism
 $V = \text{Area} \times \text{Height}$
 $V = L \times W \times H$
5 cm
7 cm
10 cm
 $V = L \times W \times H$
- 11 Volume of Prisms
Cylinder
Triangular Prism
Rectangular Prism
Trapezoidal Prism
Volume of Prism = Area of Base \times Height
- 12 Area Formulas for Prism Bases
Area of Circle = $\pi \times r^2$
Area of Rectangle = Length \times Width
Area of Trapezoid = $\frac{1}{2} \times (b_1 + b_2) \times h$
Area of Triangle = $\frac{1}{2} \times \text{base} \times \text{height}$
- 13 Which expression can be used to find the surface area of the triangular prism above?

Click to add notes

Two Layer Prism

How many cubes does this Prism hold?

Rather than count all the cubes, we can find the Volume of this prism by counting how many cubes long, wide, and tall the prism is, and then Multiplying.



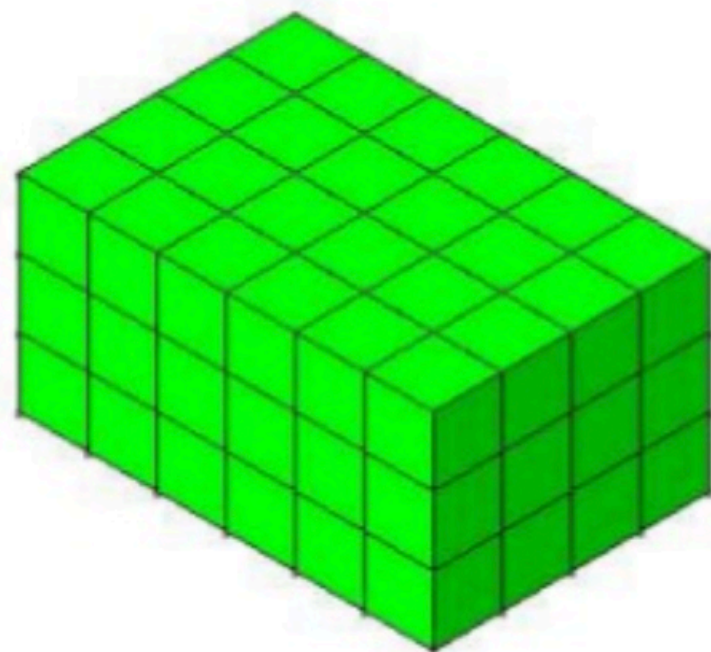
$$V = 5 \times 3 \times 2 = 30$$

There are 30 cubes in the prism, which means the volume of the Rectangular Prism is 30 cubic units.

Three Layer Prism

How many cubes does this Prism hold?

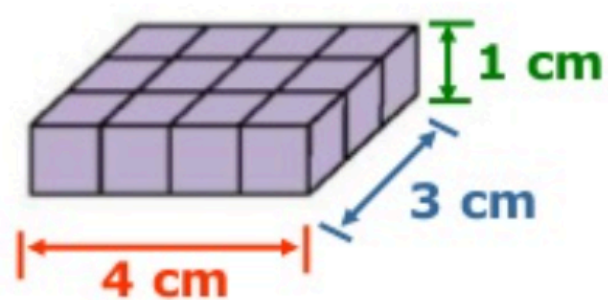
Rather than count all the cubes, we can find the Volume of this prism by counting how many cubes long, wide, and tall the prism is, and then Multiplying.



$$V = 6 \times 4 \times 3 = 72$$

There are 72 cubes in the prism, which means the volume of the Rectangular Prism is 72 cubic units.

Volume of Rectangular Prism



$$4 \text{ cm} \times 3 \text{ cm} \times 1 \text{ cm} = 12 \text{ cm}^3$$

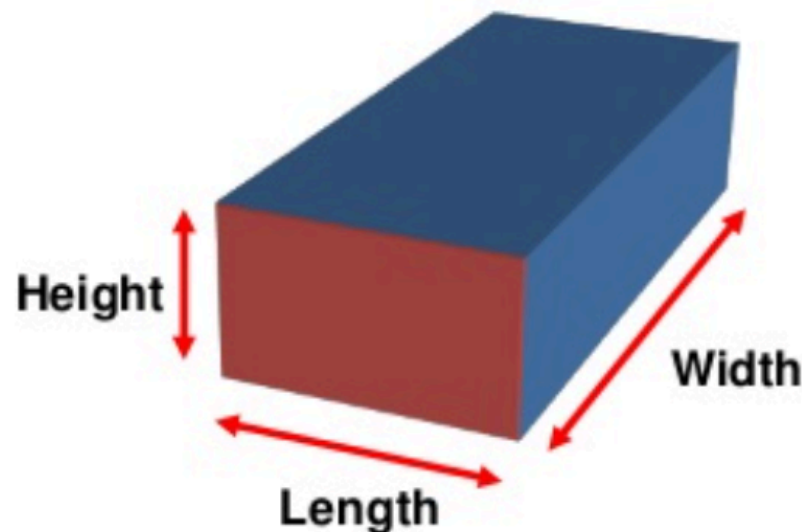
Length \times Width \times Height = Volume

area of base \times height = volume

For any Rectangular prism, the Volume is found by multiplying the Area of its base times its Height.

$$V = \text{Area} \times \text{Height}$$

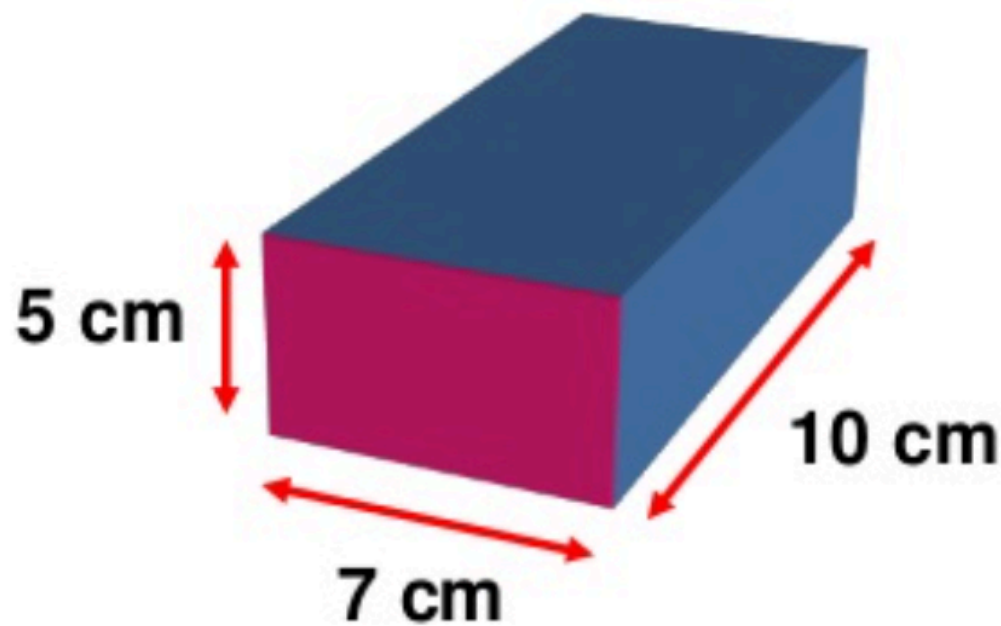
$$V = L \times W \times H$$



Volume of Rectangular Prism

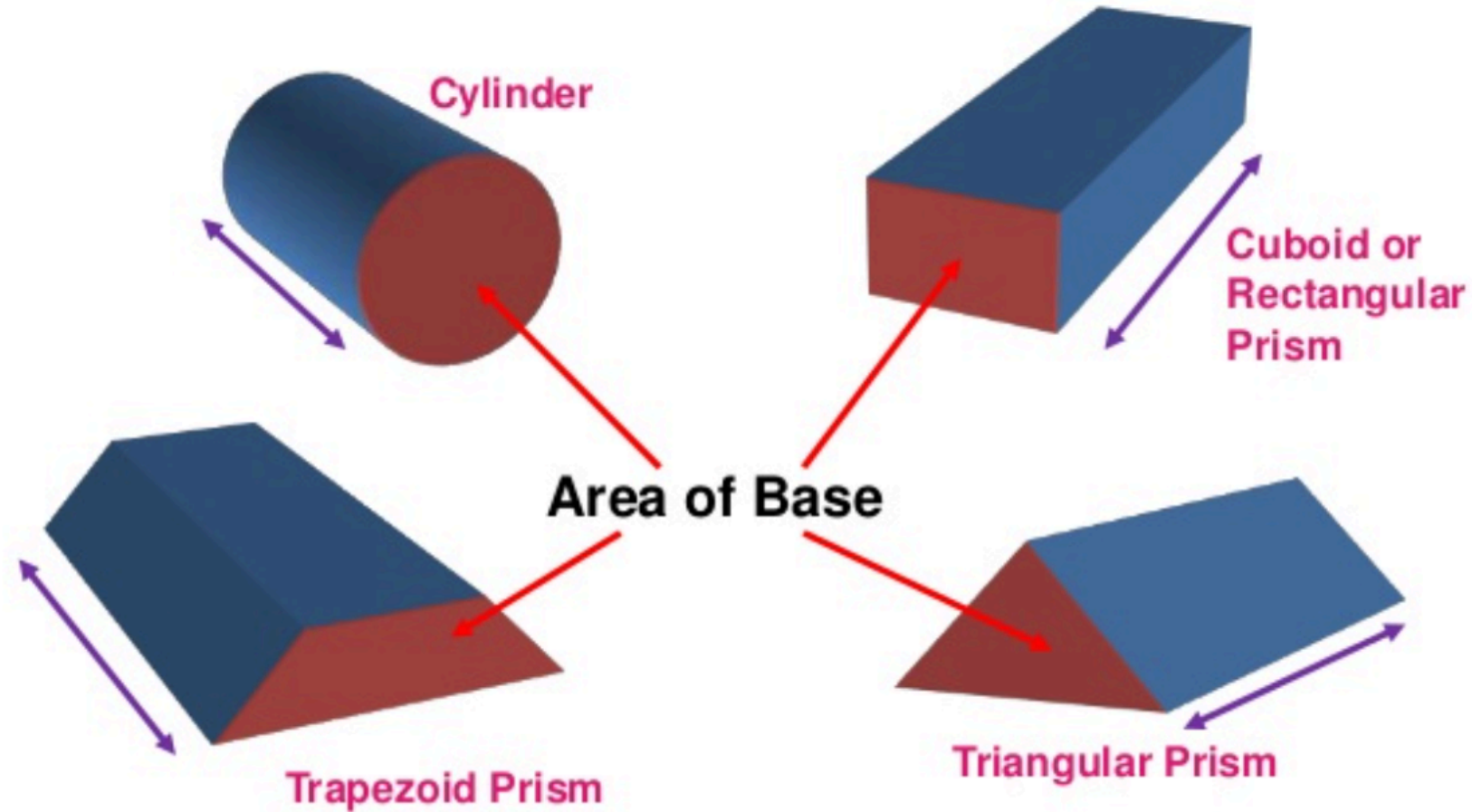
$$V = \text{Area} \times \text{Height}$$

$$V = L \times W \times H$$



$$V = L \times W \times H$$

Volume of Prisms



$$\text{Volume of Prism} = \text{Area of Base} \times \text{Height}$$

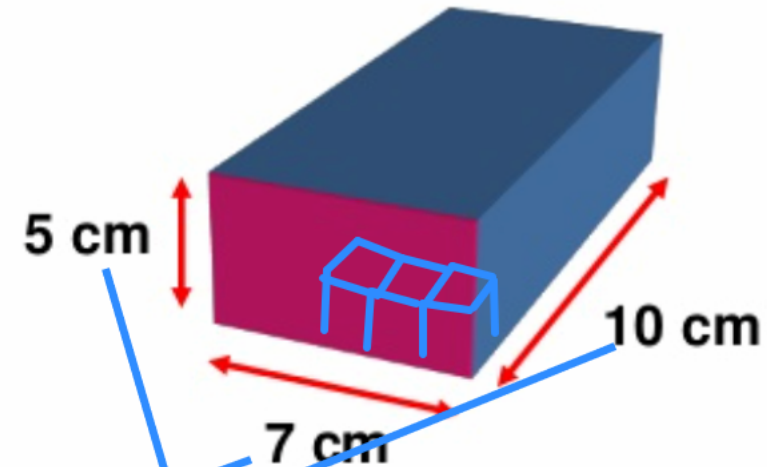
File Home Insert Design Transitions

Mouse Select Text Draw Stamp Spotlight Eraser Format Undo Redo Clear Save

Volume of Rectangular Prism

$$V = \text{Area} \times \text{Height}$$

$$V = L \times W \times H$$



$$V = L \times W \times H$$

$$V = 7 * 10 * 5 = 350 \text{ cm}^3$$

10

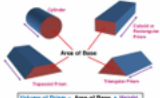
Volume of Rectangular Prism

$$V = \text{Area} \times \text{Height}$$

$$V = L \times W \times H$$

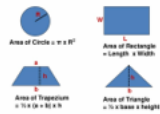
11

Volume of Prisms

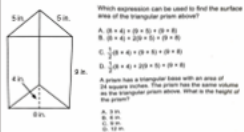


12

Area Formulas for Prism Bases



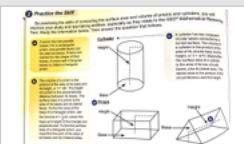
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14

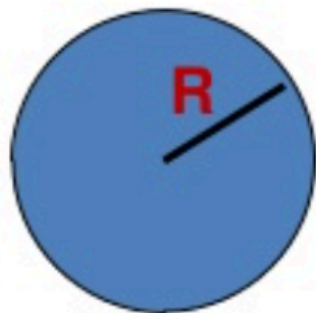


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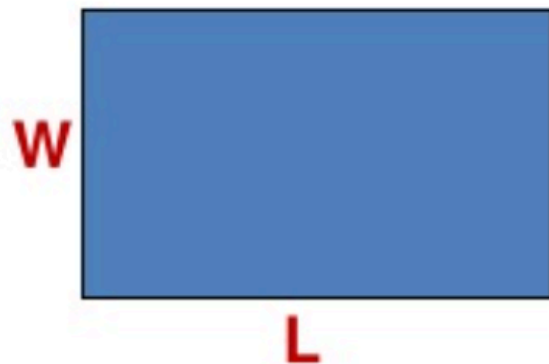


Click to add notes

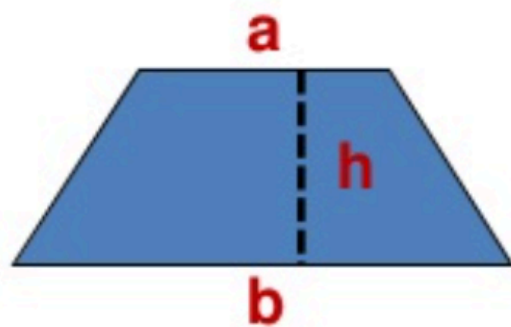
Area Formulas for Prism Bases



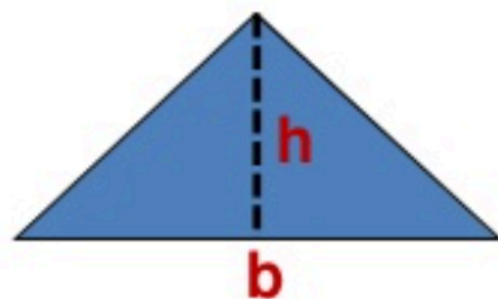
Area of Circle = $\pi \times R^2$



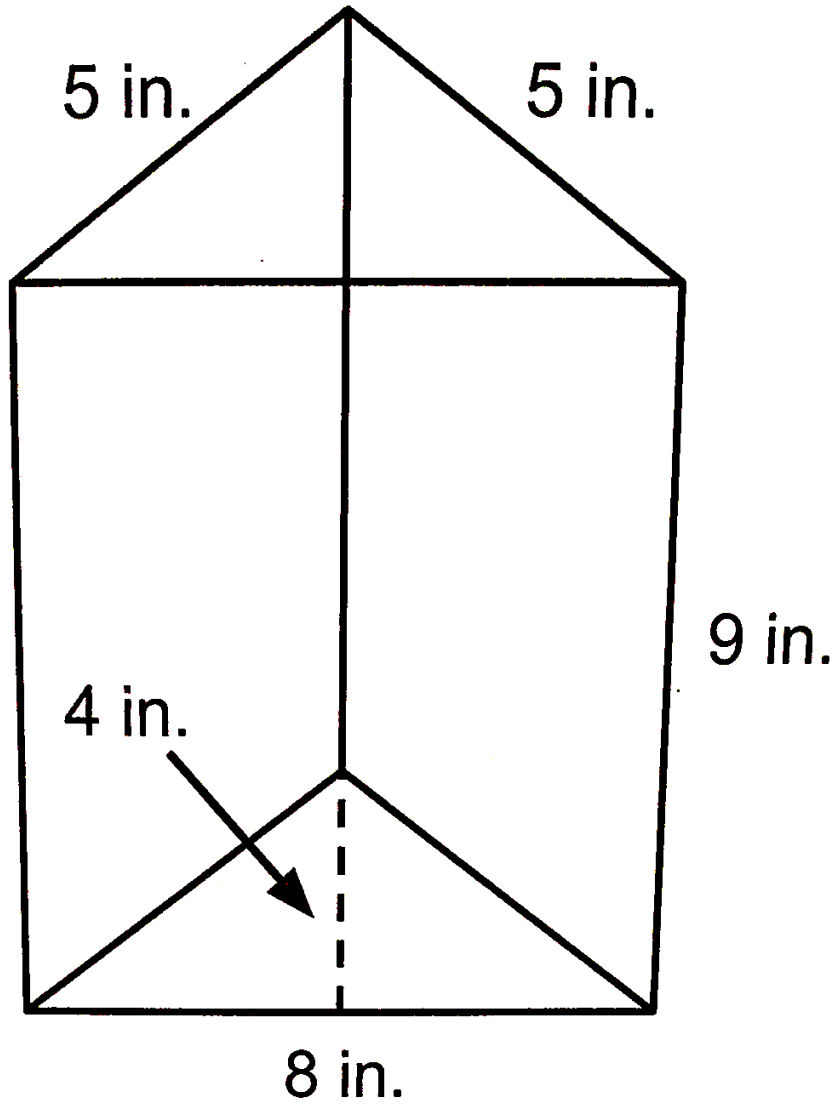
**Area of Rectangle
= Length x Width**



**Area of Trapezium
= $\frac{1}{2} \times (a + b) \times h$**

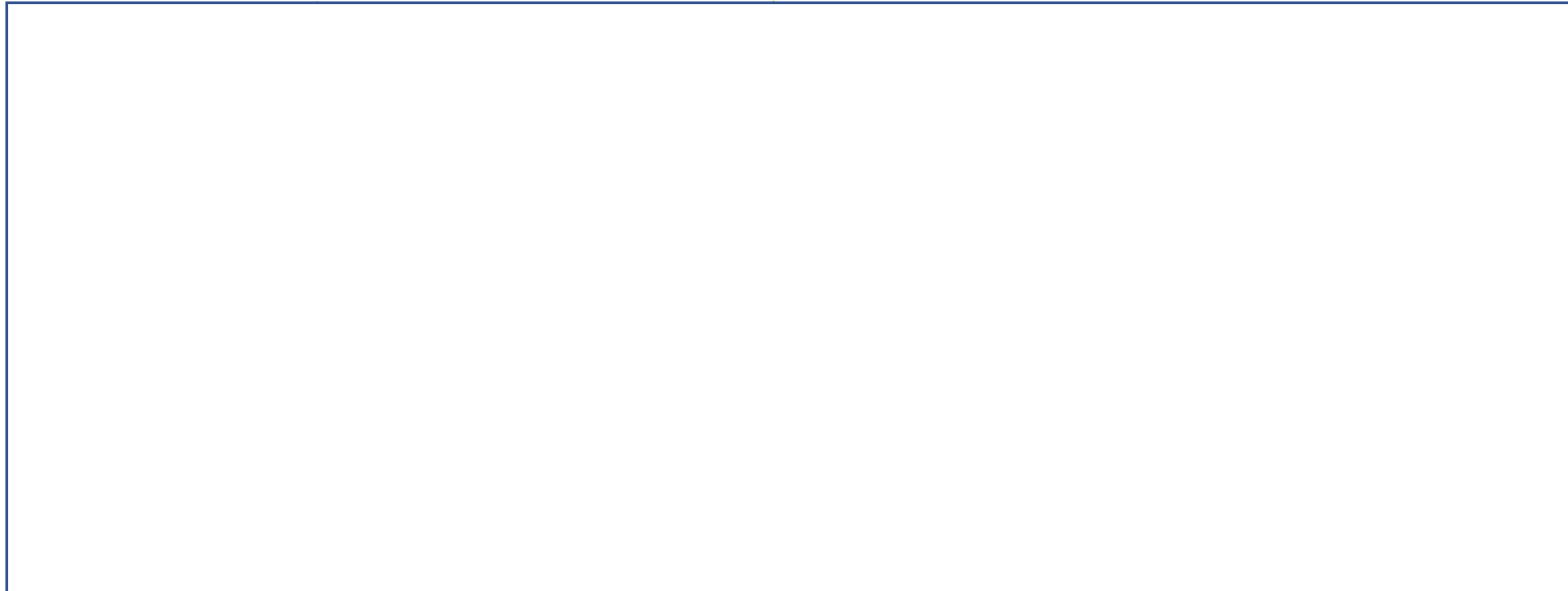


**Area of Triangle
= $\frac{1}{2} \times \text{base} \times \text{height}$**



Which expression can be used to find the surface area of the triangular prism above?

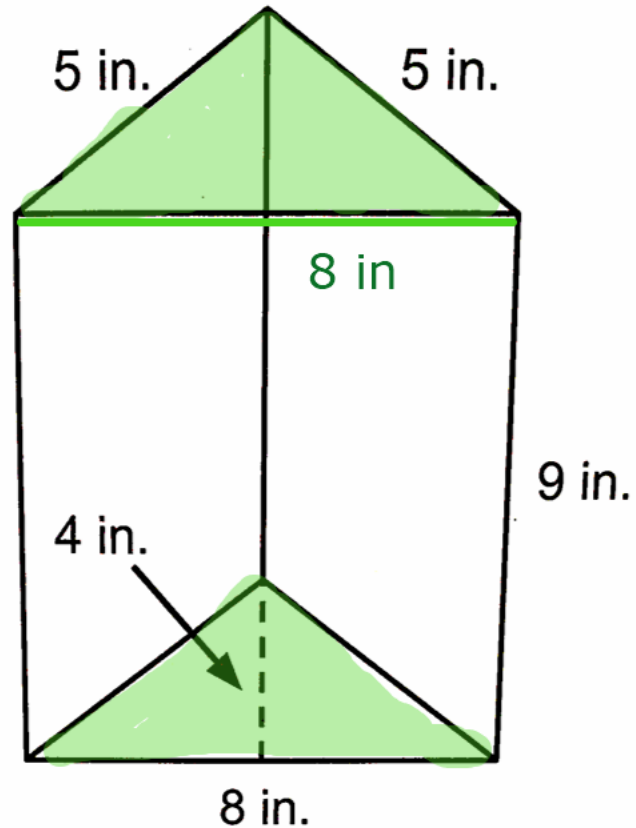
- A. $(8 \times 4) + (9 \times 5) + (9 \times 8)$
- B. $(8 \times 4) + 2(9 \times 5) + (9 \times 8)$
- C. $\frac{1}{2}(8 \times 4) + (9 \times 5) + (9 \times 8)$
- D. $\frac{1}{2}(8 \times 4) + 2(9 \times 5) + (9 \times 8)$



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Triangular prism = straight sides,
same on both ends



Which expression can be used to find the surface
area of the triangular prism above?

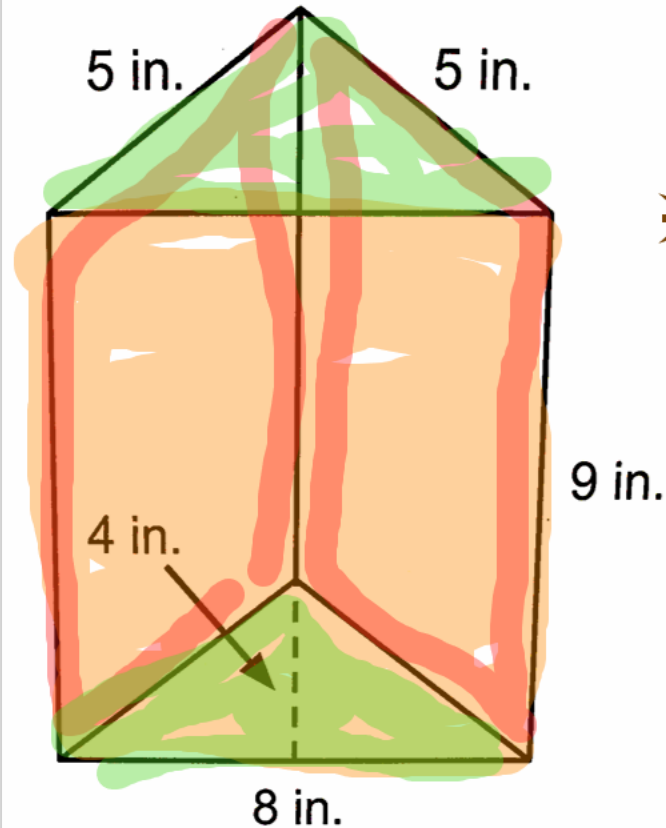
bottom triangle: $\frac{1}{2} (4)(8)$

top triangle: $\frac{1}{2} (4)(8)$

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Triangular prism = straight sides,
same on both ends



Which expression can be used to find the surface area of the triangular prism above?

A. $(8 \times 4) + (9 \times 5) + (9 \times 8)$

B. $(8 \times 4) + 2(9 \times 5) + (9 \times 8)$

C. $\frac{1}{2}(8 \times 4) + (9 \times 5) + (9 \times 8)$

D. $\frac{1}{2}(8 \times 4) + 2(9 \times 5) + (9 \times 8)$

$\frac{1}{2} \times 2 = 1$

bottom triangle: $\frac{1}{2}(4)(8)$

top triangle: $\frac{1}{2}(4)(8)$

right side, rectangle: $(9)(5)$

left side, rectangle: $(9)(5)$

bottom rectangle: $(9)(8)$

16

16

45

45

72

 194 in²

Cylinders



2 Practice the Skill

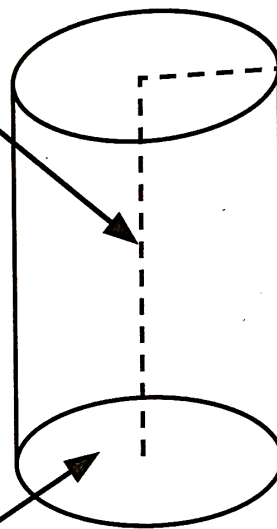
By practicing the skills of computing the surface area and volume of prisms and cylinders, you will improve your study and test-taking abilities, especially as they relate to the GED® Mathematical Reasoning Test. Study the information below. Then answer the question that follows.

a A prism has two parallel bases. For a rectangular prism, any parallel faces can be used as bases. Prisms are named for the shape of their bases. A prism with triangular bases is called a triangular prism.

b The volume of a prism is the product of the area of its base and its height, or $V = Bh$. The height of a prism is the perpendicular distance between its bases. The surface area of a prism is the area of its bases and its lateral faces. To find the area of the base of a triangular prism, use the formula $A = \frac{1}{2}bh$, where the base and height of the triangle are perpendicular. To find the surface area of a triangular prism, you must find the sum of the area of its bases and its 3 lateral sides.

Cylinder

Height

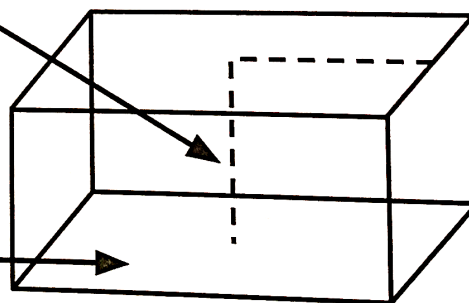


Base

c A cylinder has two congruent circular bases connected by a curved surface. The volume of a cylinder is the product of the area of its circular base and its height, or $V = \pi r^2 h$. Meanwhile, the surface area of a cylinder is the area of its two circular bases, plus its lateral area. The lateral area is the product of the circumference and the height.

a Prism

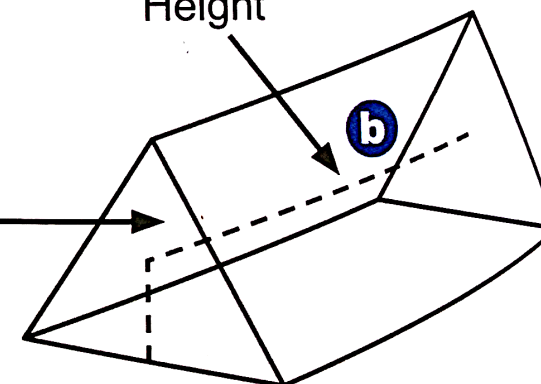
Height



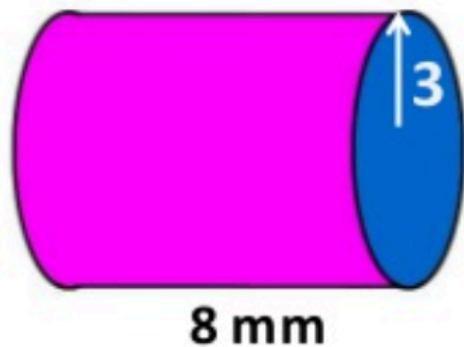
Base

Height

Base



Volume of Cylinder - FORMULA



$$V = \pi \times R \times R \times H$$

or

$$V = \pi R^2 H$$

$$V = \pi \times R \times R \times H$$

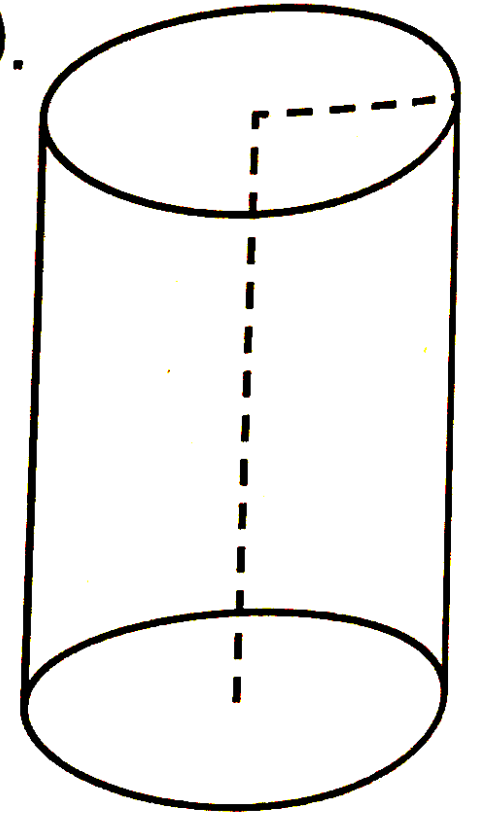
$$V = \pi \times 3 \times 3 \times 8$$

$$V = 226.1946 \text{ mm}^3$$

$$V = 226 \text{ mm}^3 \checkmark$$

A company sells oatmeal in a cylindrical canister (*right*). The canister has a height of 8 inches, and the radius of the base is 3 inches. What is the volume of the container to the nearest cubic inch?

- A. 24 in.³
- B. 72 in.³
- C. 226 in.³
- D. 678 in.³



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A company sells oatmeal in a cylindrical canister (*right*). The canister has a height of 8 inches, and the radius of the base is 3 inches. What is the volume of the container to the nearest cubic inch?

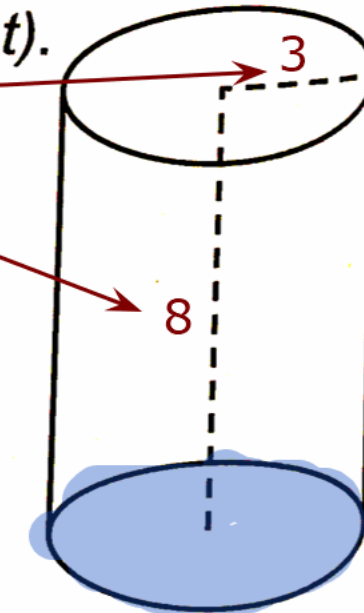
A. 24 in.³B. 72 in.³C. 226 in.³D. 678 in.³

Volume = Area (circle) * height

$$(3.14) (3^2) (8)$$

9

$$3.14 * 9 * 8 = 226.08$$

 r^2 

$$A = \pi r^2$$



LESSON 8

Pyramids, Cones, and Spheres

MATH CONTENT TOPICS: Q.2.a, Q.2.e, Q.5.d, Q.5.e

MATH PRACTICES: MP.1.a, MP.1.b, MP.1.e, MP.2.c, MP.4.a, MP.4.b

1 Learn the Skill

A **pyramid** is a 3-dimensional figure that has a polygon as its single base and triangular faces. A **cone** has one circular base. The volume of a pyramid is $V = \frac{1}{3}Bh$. The volume of a cone is $V = \frac{1}{3}\pi r^2h$.

The **surface area** of a solid figure is the sum of the areas of surfaces. The surface area of a pyramid is the sum of the area of its base and its triangular faces. Use the slant height (height of the triangle) to find the areas of the faces. The formula for surface area of a pyramid is $SA = B + \frac{1}{2}Ps$, where B is the area of the base, P is the perimeter of the base, and s is the slant height. The surface area of a cone is the sum of its circular base and its curved surface. The formula for surface area is $SA = \pi r^2 + \pi rs$.

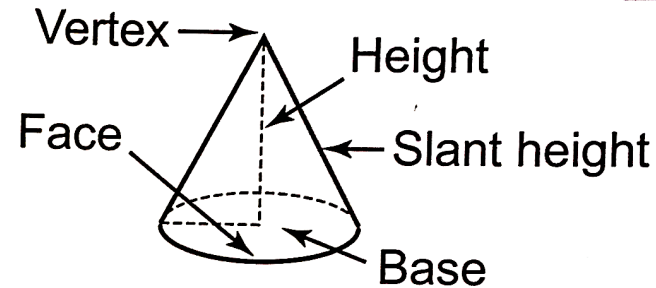
A **sphere** is shaped like a ball and has no bases or faces. The formula for volume of a sphere is $\frac{4}{3}\pi r^3$. The formula for surface area of a sphere is $4\pi r^2$.

2 Practice the Skill

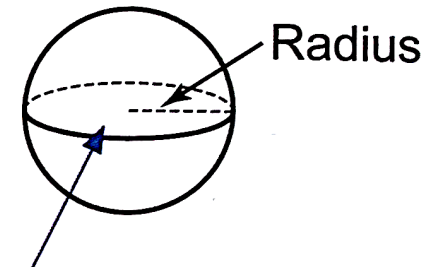
By practicing the skills of computing the area and volume of pyramids, cones, and spheres, you will improve your study and test-taking abilities, especially as they relate to the GED® Mathematical Reasoning Test. Study the figures and information below. Then answer the question that follows.

- a** A cone has a circular base and one vertex. The two are connected by a curved surface, which, when unwrapped, forms part of a circle. The length of the curved edge of the part of the circle is equal to the circumference of the base. The radius of the part of the circle is equal to the slant height, s , of the cone.

→ **Cone**

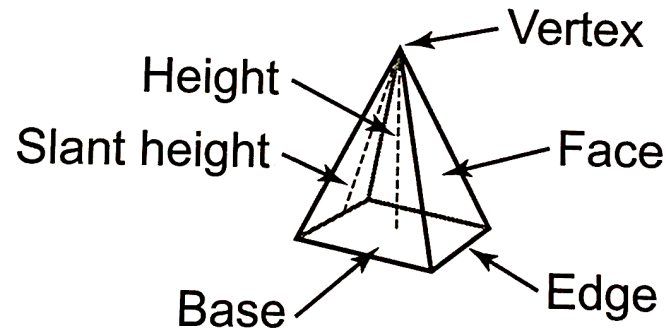


Sphere



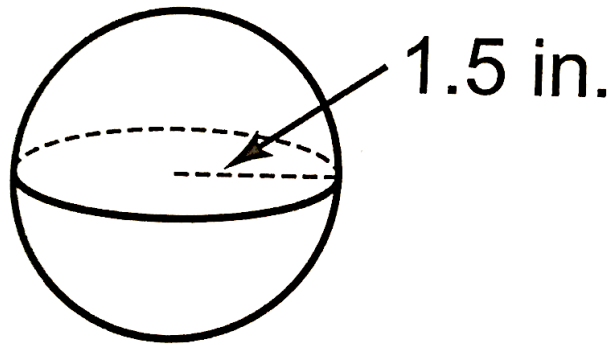
- b** A square pyramid has a square base and four congruent triangular faces. The faces all connect to a single point called a vertex. The height of a square pyramid forms a right angle with its base. The slant height, s , is not perpendicular to the base. It extends from the base of the triangular face to the vertex.

→ **Square pyramid**



- c** Half of a sphere is called a hemisphere. The volume of a hemisphere is half the volume of the sphere. The surface area of a hemisphere is the area of half the surface of the sphere, plus the area of the circular base. The radius of the base is equal to the radius of the sphere.

- . A factory manufactures solid spherical rubber balls with a radius of 1.5 inches. To the nearest cubic inch, what volume of rubber is required to manufacture one ball?



- A. 14 in.^3
- B. 28 in.^3
- C. 36 in.^3
- D. 42 in.^3

Math vocabulary review

- Integer
- Root (of a quadratic equation)
- Perimeter
- Factor

The place where a parabola touches the x-axis, having a value of zero

A whole number, not a fraction or decimal

What is multiplied together to make a product

The distance all the way around a shape

Math vocabulary review

- Exponent
- Slope
- Median
- Y-intercept

When a number is multiplied by itself a certain number of times

The place that any graph crosses the y-axis; the value of the graph when x is equal to zero

The middle number in a group of values

The vertical change in a graph across one unit of change to the right

Homework!

Active Assignments



Week 14

To begin, select an activity from All Activities

Select New Activity 



All Activities

Completion: 0/5 (0%)



No Due Date