

Name: \_\_\_\_\_

## **Chapter 2: Surface Area and Volume**

### **2.1 Surface Area of Prisms and Cylinders**

**Outcomes:** Solve problems, using SI and imperial units, that involve the surface area of 3-D objects, including right prisms and cylinders.

**Review:**

1) Find the area of a triangle, where the base is 4cm and the height is 10 cm

2) Find the area of a rectangle where the length is 12 m and the width is 7 m

**Definitions:**

Surface Area: the sum of the areas of each face of the object.

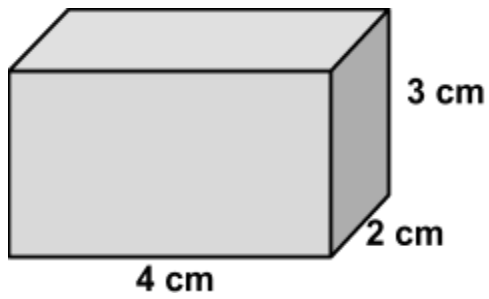
\*\*\*ALWAYS MEASURED IN SQUARE UNITS\*\*\*

Prisms: three-dimensional object which has two bases or ends that have the same size and shape and are parallel to each other.

Cylinder: Three-dimensional object with two parallel and congruent circular bases.

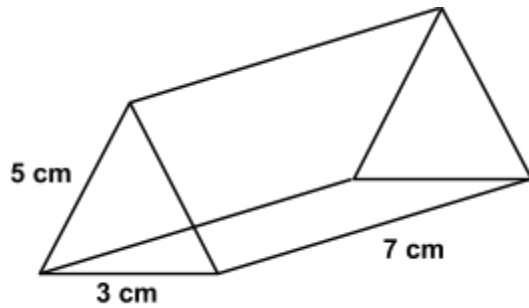
**Example 1:**

Identify what three-dimensional shape is and the surface area of the shape below.



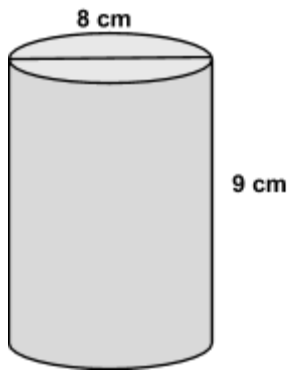
**Example 2:**

Identify what three-dimensional shape is and the surface area of the shape below.



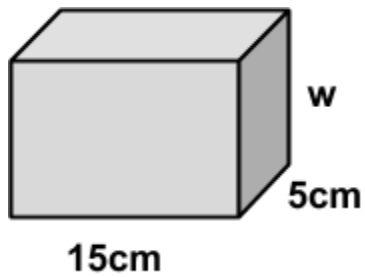
**Example 3:**

Identify what three-dimensional shape is and the surface area of the shape below.



**Example 4:**

Find the width if the SA =  $500\text{cm}^2$



## 2.2 Surface Area of Pyramids and Cones

**Outcomes:** Solve problems, using SI and imperial units, that involve the surface area of 3-D objects, including right pyramids and cones.

**Definitions:**

Pyramid: A three-dimensional object with one base and the same number of triangular faces as there are sides on the base.

For example: Square-based Pyramid; Rectangular Pyramid; Triangular Pyramid

Cone: Three-dimensional object with a circular base and a curved lateral side that extends from the base to the vertex.

Slant Height: the shortest lateral distance from the edge of the base of a pyramid to its highest point.

Lateral Area: the surface that joins the two bases of a three-dimensional object or that joins the base to the highest point

**Review:**

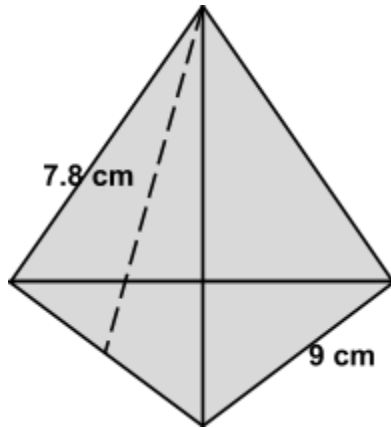
Find the area of a circle with:

a) Diameter of 6ft

b) Radius of 2cm

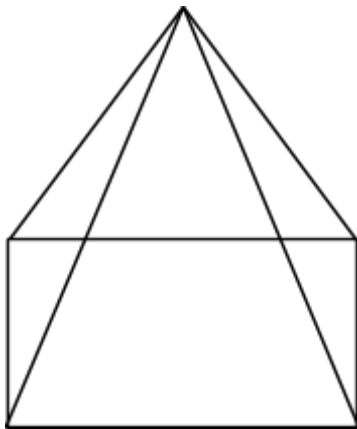
**Example 1:**

Calculate the surface area of the tetrahedron pyramid.

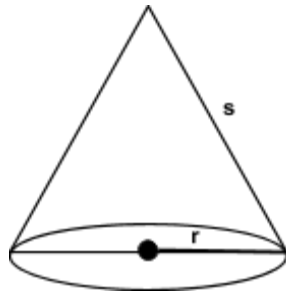


**Example 2:**

A right rectangular pyramid has base dimensions 8ft by 10ft, and a height of 16ft. Calculate the surface area of the pyramid to the nearest square foot.



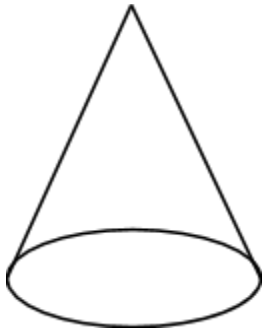
### Surface Area of a Cone:



$$SA = \pi rs + \pi r^2$$

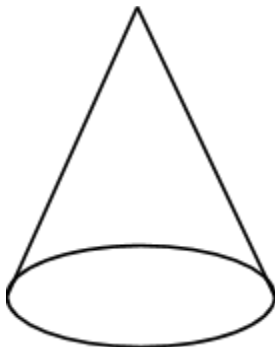
#### **Example 3:**

A right cone has a base radius of 2ft and a height of 7ft. Calculate the surface area of the cone to the nearest foot.



#### **Example 4:**

The lateral area of a cone is  $220 \text{ cm}^2$ . The diameter of the cone is 10 cm. Determine the height of the cone, to the nearest tenth of a cm.



**Textbook Questions:** Pg. 74. #1cd, 2, 7, 12, 14, 16

## 2.3 Surface Area Spheres

**Outcomes:** Solve problems, using SI and imperial units, that involve the surface area of 3-D objects, including spheres

**Definitions:**

Sphere: a round, ball-shaped object

A set of points in space that are a given distance (radius) from a fixed point (centre)

**Surface Area of a Sphere:**

$$SA = 4\pi r^2$$

**Example 1:**

The diameter of a baseball is approximately 3 in. Determine the surface area of a baseball to the nearest square inch.

**Example 2:**

The surface area of a lacrosse ball is approximately 20 square inches. What is the diameter of the lacrosse ball to the nearest tenth of an inch.

**Textbook Questions:** Pg. 74 #1e, 3c, 5, 13, 15

## 2.4 Volume of Prisms, Cylinders and Spheres

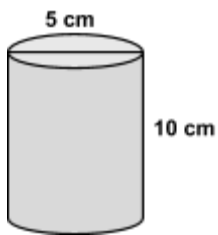
**Outcomes:** Solve problems, using SI and imperial units, that involve the volume of 3-D objects, including right prisms, right cylinders, and spheres.

To calculate the volume of prisms and cylinders, simply calculate the area of the base then multiply by the height.

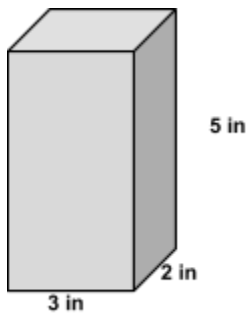
### **Example 1:**

1. Calculate the volume of each shape:

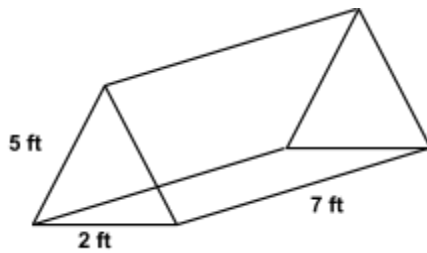
a)



b)



c)



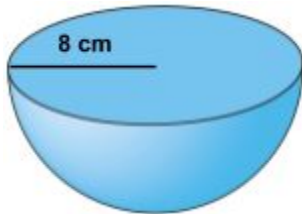


To calculate the volume of a sphere, use the formula  $V = \frac{4}{3}\pi r^3$

2. Calculate the volume of the sphere that has a radius of 4.5 inches.

3. A hemisphere has a radius of 8 cm.

a) What is the surface area of the hemisphere to the nearest tenth of a square cm?



b) What is the volume of the hemisphere to the nearest tenth of a cubic cm?

## 2.5 Volume of Pyramids and Cones

**Outcomes:** Solve problems, using SI and imperial units, that involve the volume of 3-D objects, including right pyramids and cones.

To calculate the volume of pyramids, use the following formula:

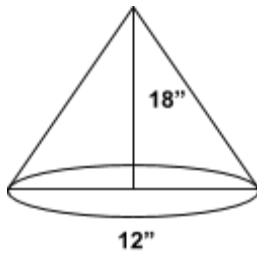
$$V = \frac{1}{3}lwh$$

To calculate the volume of cones, use the following formula:

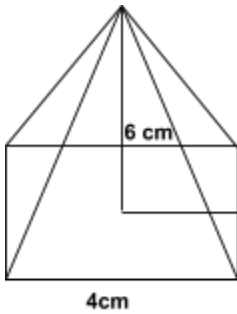
$$V = \frac{1}{3}\pi r^2 h$$

1. Calculate the volume of each shape:

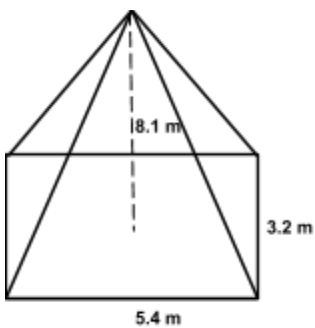
a)



b)



c)



2. A cone has a height of 4 yd and a volume of 205 cubic yards. Determine the radius of the base of the cone to the nearest whole number.

**Textbook Questions:** Pg. 86 # 1(ab), 2(ab), 9 - 11, 12, 18