Geometry/Trig
Unit 10 – Area and Volume of Solids
Notes Packet

Day 1 Notes - Prisms

Rectangular Prism: _____
_____

Total Area: _____
_____

Lateral Area: _____
_____

How do we find Total Area?

Example 1

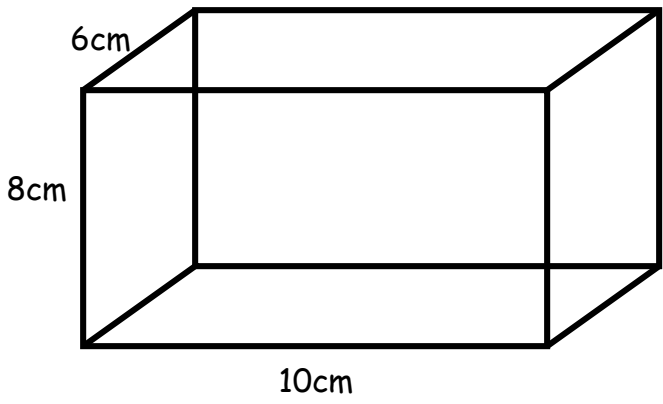Find the area of each face:

Front: _____

Back: _____

Top: _____

Bottom: _____

Left Side: _____

Right Side: _____

Total: _____

6cm

8cm

10cm

Total Area: _____

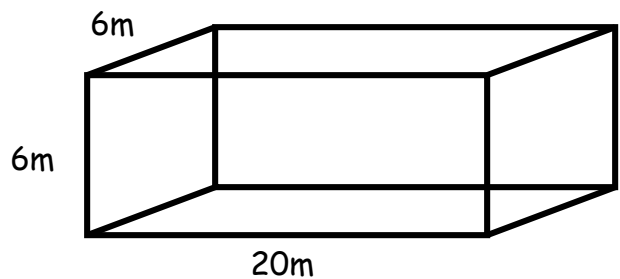Lateral Area: _____

How do you find the Lateral Area? _____

Formula for the Lateral Area of Prism: _____

Formula for the Total Area of Prism: _____
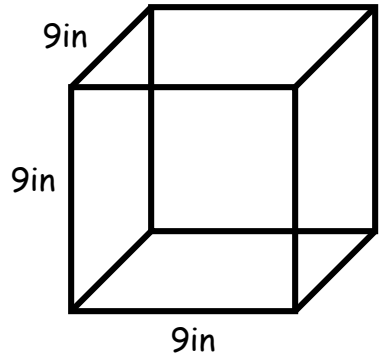
Example 2

Lateral Area: _____

Total Area: _____

6m

6m

20m

Example 3

Lateral Area: _____

Total Area: _____

9in

9in

9in

Volume: _____

Units: _____

Formula for Volume of Prism: _____

Revisit Example 1: Dimensions: 6cm, 8cm, 10cm

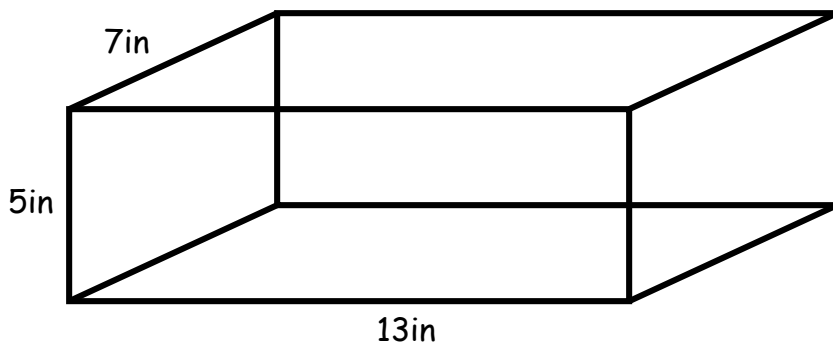
    Volume: _____

Revisit Example 2: Dimensions: 6m, 6m, 20m

    Volume: _____

Revisit Example 3: Dimensions: 9in, 9in, 9in

    Volume: _____

Example 4: Find the Lateral Area, Total Area, and Volume of the rectangular prism.

7in

5in

13in

Lateral Area: _____   Total Area: _____   Volume: _____

$V = Bh$ Volume (V) = Area of the Base x height of the prism

$LA = ph$ Lateral Area (LA) = Perimeter of Base x height
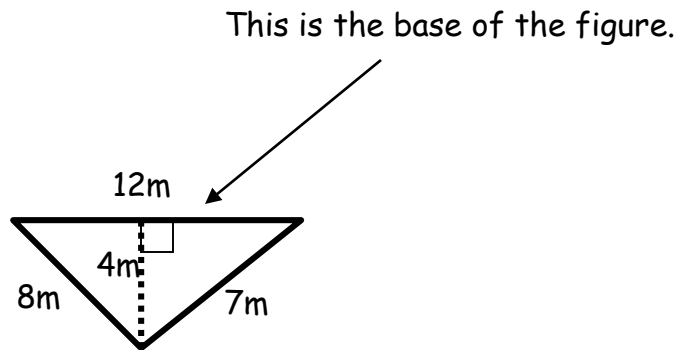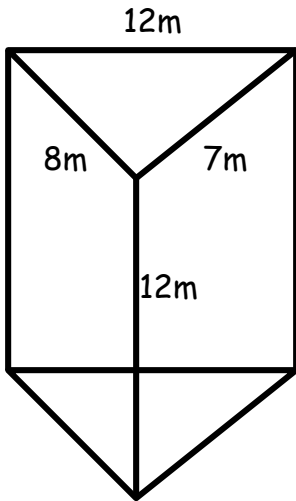
$TA = LA + 2B$ Total Area (TA) = Lateral Area + 2(Area of the Base)

p = Perimeter of Base   h = height of Prism   B = Area of Base

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Example 1: Find the Lateral Area, Total Area and Volume of the Triangular Right Prism.

This is the base of the figure.

Area of the Base: Volume:
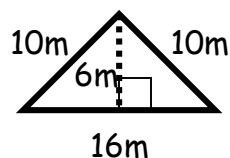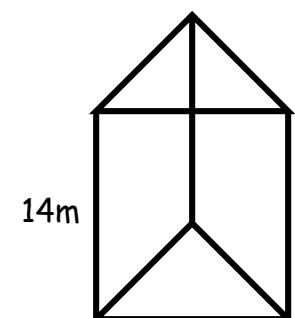
Perimeter of the Base:

Height:

Lateral Area: Total Area:

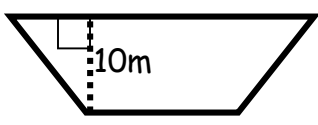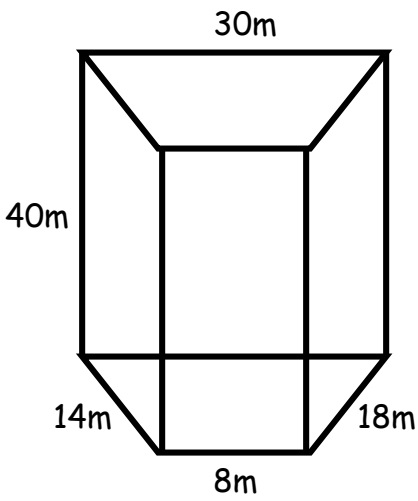Example 2: Find the Lateral Area, Total Area and Volume of the Triangular Right Prism.

Volume:

Lateral Area:

Total Area:

Example 3: Find the Lateral Area, Total Area and Volume of the Trapezoidal Right Prism.
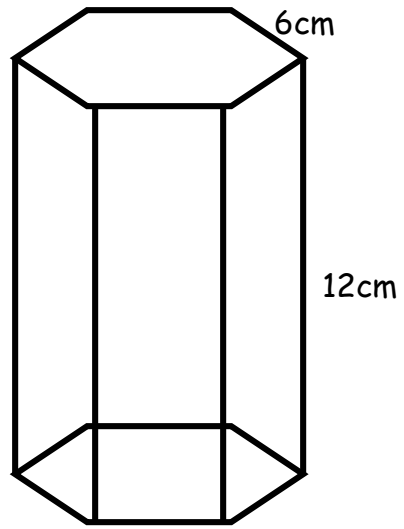
30m

40m

14m   18m

8m

10m

Volume:

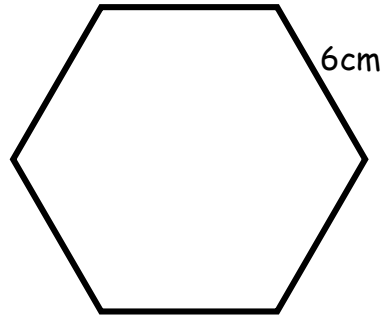Lateral Area:

Total Area:

Example 4: Find the Lateral Area, Total Area and Volume of the Hexagonal Right Prism.
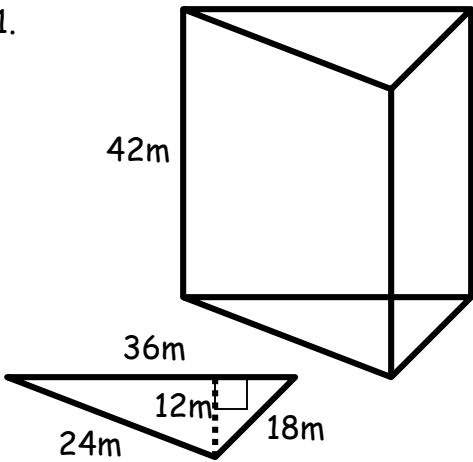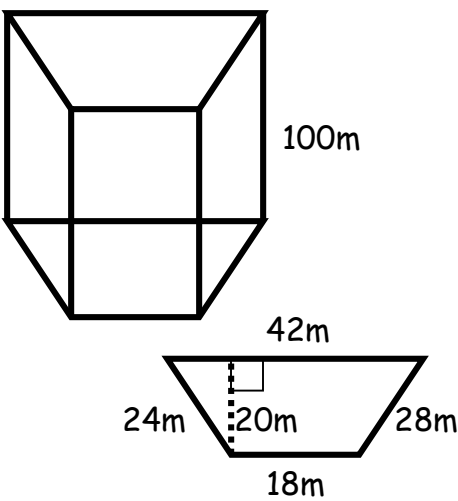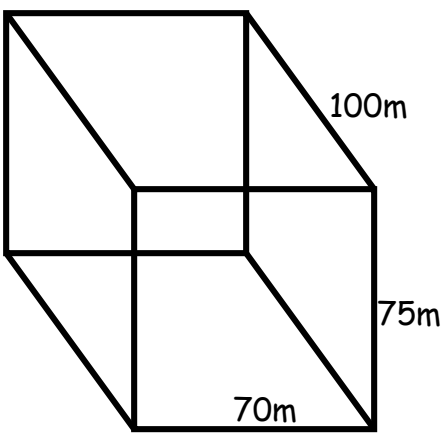
6cm

12cm

Volume:

Lateral Area:

Total Area:

6cm

Base is a Regular Hexagon

Day 1 Practice

Find the Volume, Lateral Area, and Total Area of each figure.

Figure	Volume	Area
1. 42m 36m 12m 18m 24m		Lateral Area: Total Area:
2. 100m 42m 24m 20m 28m 18m		Lateral Area: Total Area:
3. 100m 75m 70m		Lateral Area: Total Area:

Day 2 Notes - Pyramids

Regular Pyramid - _____
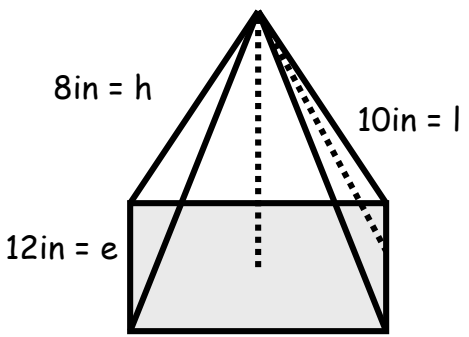We will be looking at square pyramids.
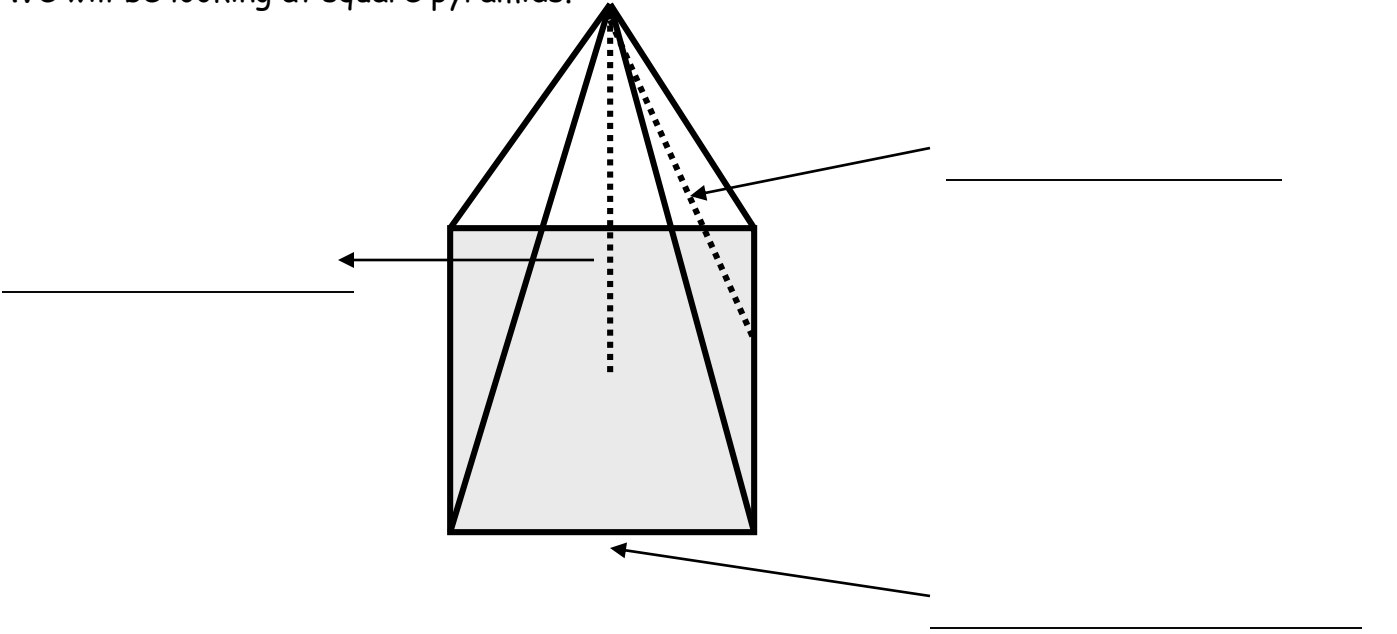
Lateral Area - _____

Total Area - _____

Volume - _____

Therefore, we need to find the following four pieces of information for each problem:
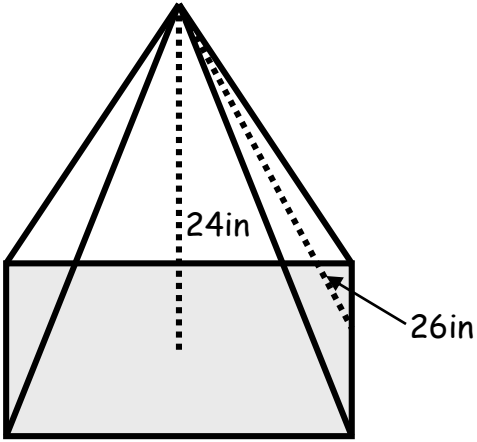
      1. Area of the base – $A = e^2$

      2. Perimeter of the base – $P = 4e$

      3. Height – h

      4. Slant height - l

Example 1 –
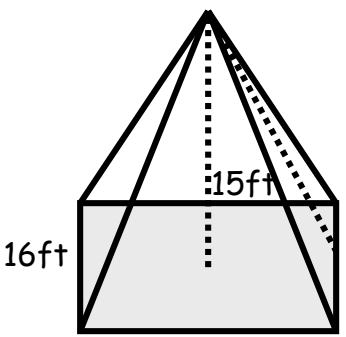
8in = h

10in = l

12in = e

Base Edge - _____

Height – _____

Slant Height – _____

Area of the base – _____

Perimeter of the base - _____

Lateral Area - _____

Total Area - _____

Volume - _____

Example 2 –

24in

26in

Base Edge - _____

Height – _____

Slant Height – _____

Area of the base – _____

Perimeter of the base - _____

Lateral Area - _____

Total Area - _____

Volume - _____

Example 3 -

15ft

16ft

Base Edge - _____

Height – _____

Slant Height – _____

Area of the base – _____

Perimeter of the base - _____

Lateral Area - _____

Total Area - _____

Volume - _____

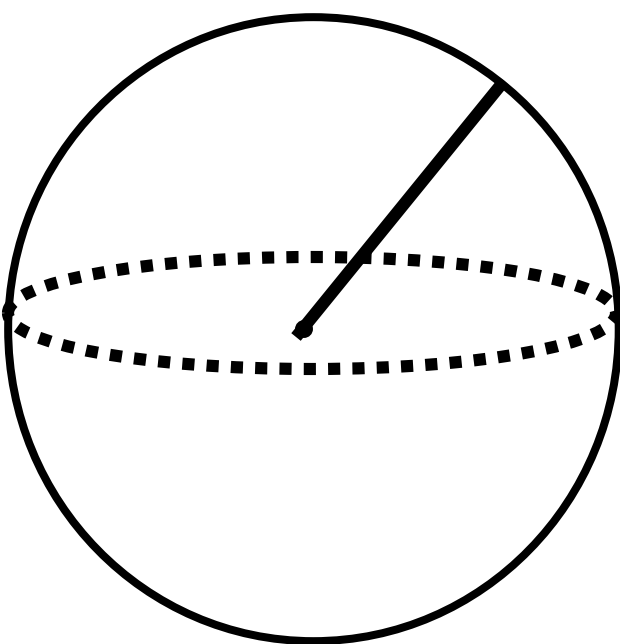**Day 2 Notes – Spheres**

Sphere - _____
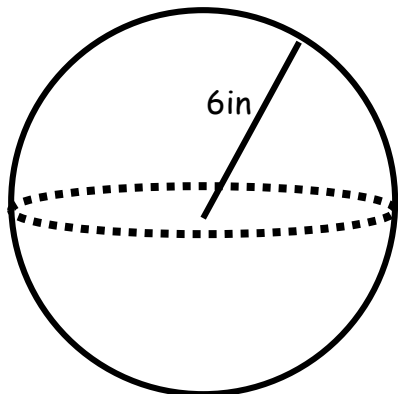
_____

Volume - _____

Total Area - _____

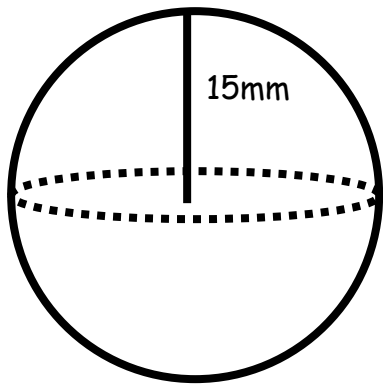Example 1 – Find the Total Area and Volume of the Sphere

6in

Radius - _____

Volume - _____

Total Area - _____

Day 2 Practice – Spheres

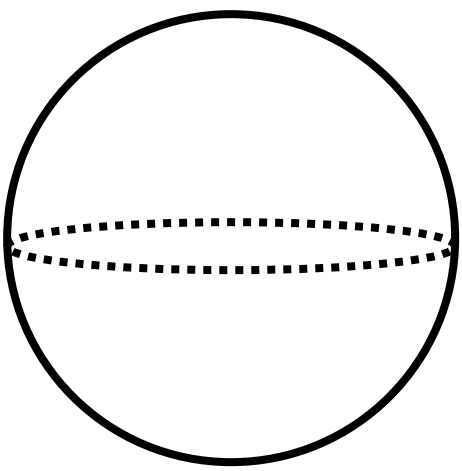Example 2 – Find the Total Area and Volume of the Sphere

15mm

Radius - _____

Volume - _____

Total Area - _____

Example 3 – Find the Total Area and Volume of the Sphere

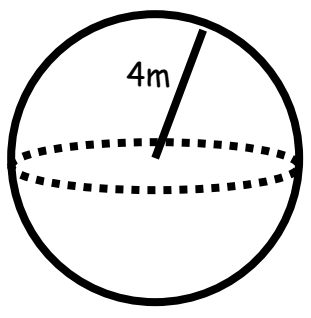$C = 20\pi$in

Radius - _____

Volume - _____
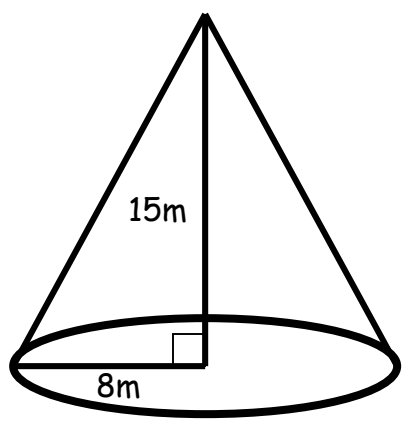
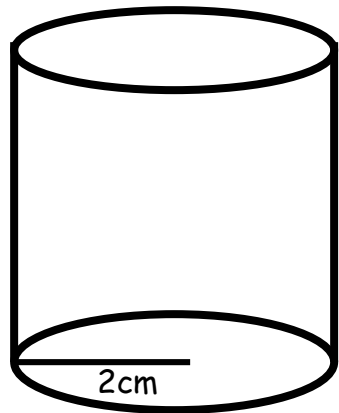Total Area - _____

Mixed Review

Figure	Volume	Area
1. 4m Name: _____		
2. 15m 8m Name: _____		Lateral Area: Total Area:
3. 4.3cm 2cm Name: _____		Lateral Area: Total Area:

Mixed Review
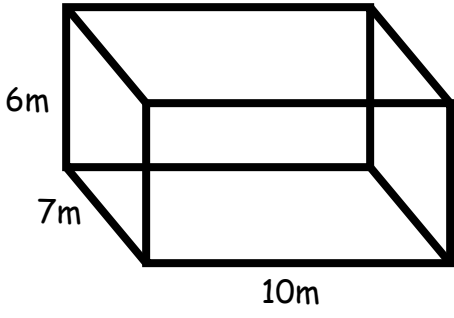
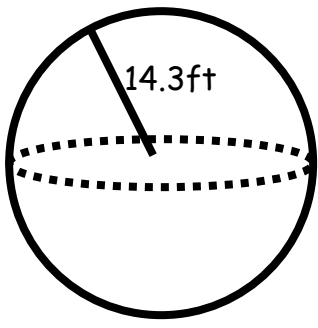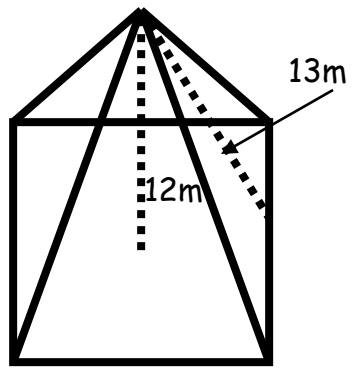| Figure	Volume	Area
1. 6m 7m 10m Name: _____		Lateral Area: Total Area:
2. 14.3ft Name: _____		Total Area:
3. 13m 12m Name: _____		Lateral Area: Total Area:

Day 3 Notes – Cylinders

A **cylinder** is like the right prisms except that the bases of a cylinder are _____.
The volume and total area can be calculated in a very similar manner.

In a cylinder, the formula for Volume is exactly the same. Multiply the Area of the Base (B) by the height (h). In this case the base is a circle. Recall that the area of a circle is calculated by using A = _____.

The Lateral Area and Total Area is calculated in a similar manner. However we must replace "perimeter of base" with _____, use _____

Formulas:

LA = _____

TA = _____

V = _____

Example 1 – Find the Total Area and Volume of the given cylinder.

Radius – _____

Area of Base – _____

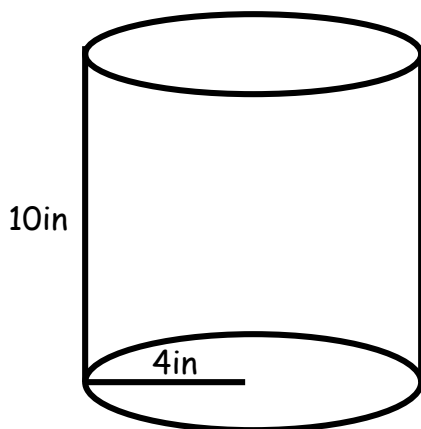Height – _____

Volume –

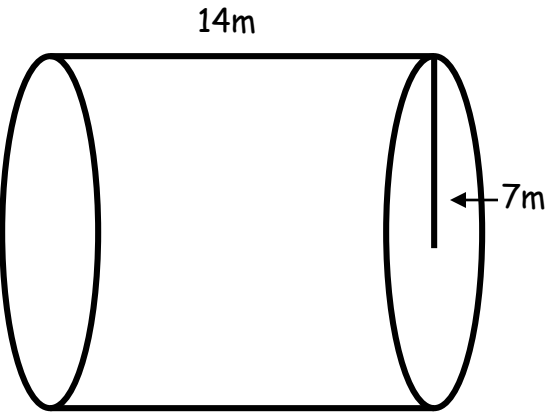Lateral Area –

Total Area -

10in

4in

Example 2

14m

←7m

Radius – _____

Area of Base – _____
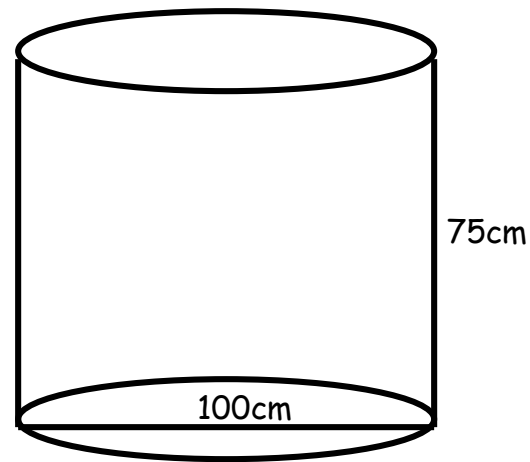
Height – _____

Volume –

Lateral Area -

Total Area –

Example 3

75cm

100cm

Radius – _____

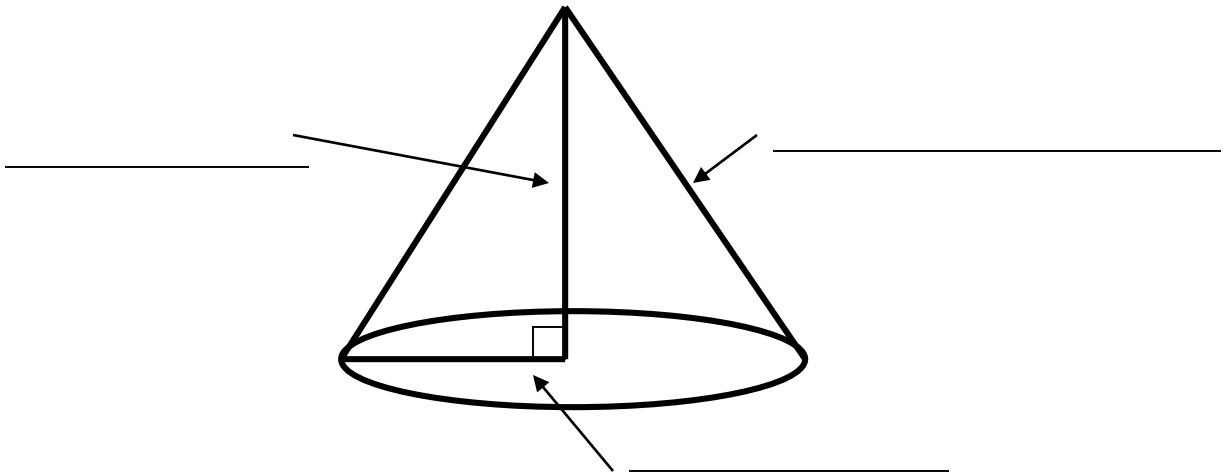Area of Base – _____

Height – _____

Volume –

Lateral Area -

Total Area -

Day 3 Notes – Cones
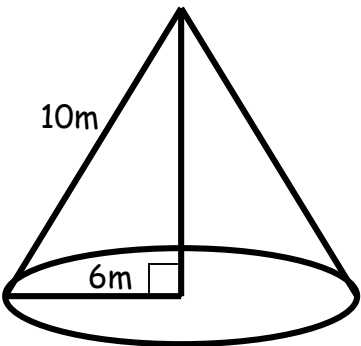
Cone - _____

Volume - _____

Lateral Area - _____

Total Area - _____

Therefore, now we need to find the four key pieces of information first:

      1. Area of the base – _____

      2. Height - _____
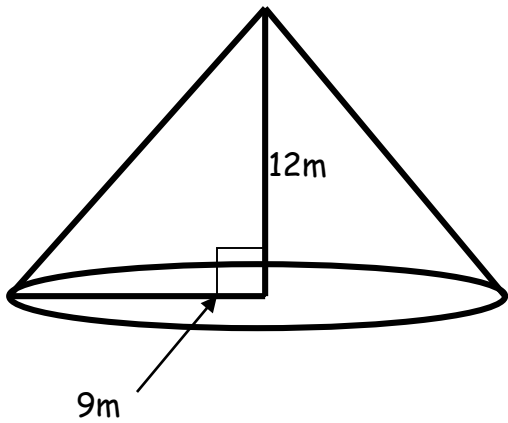
      3. Slant height - _____

Example 1 – Find the Volume and Total Area

Radius - _____

Area of the base – _____

Height - _____

Slant height – _____
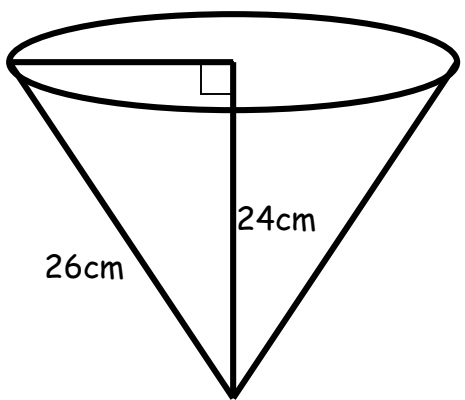
Lateral Area - _____

Total Area - _____

Volume - _____

Example 2 – Find the Volume and Total Area

Radius - _____

Area of the base – _____

Height - _____

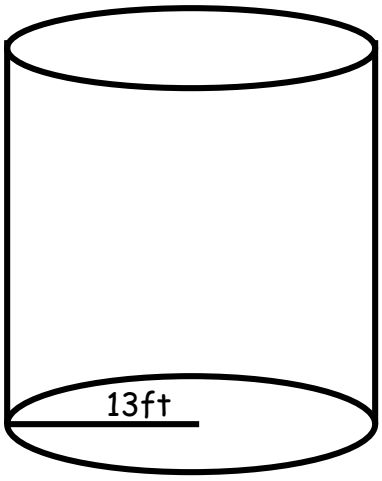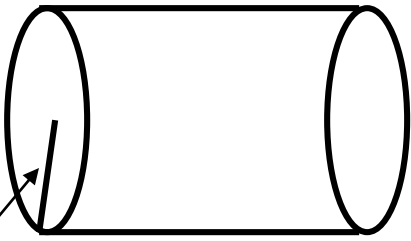Slant height – _____

Lateral Area - _____

Total Area - _____

Volume - _____

Example 3 – Find the Volume and Total Area

Radius - _____

Area of the base – _____

Height - _____

Slant height – _____
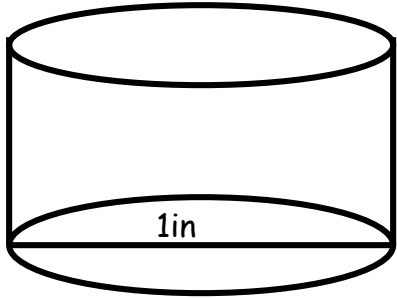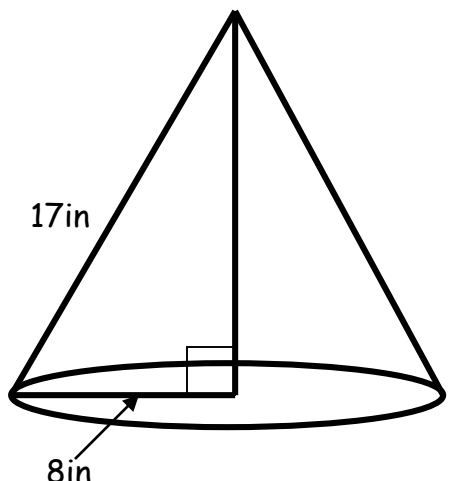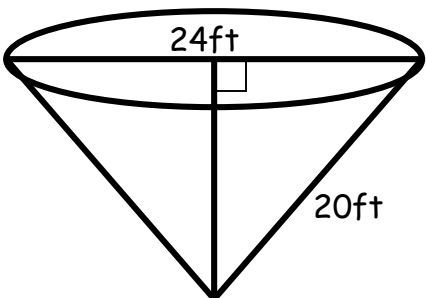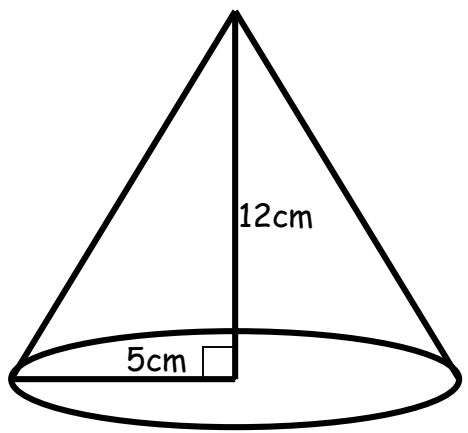
Lateral Area - _____

Total Area - _____

Volume - _____

Cylinders Practice

Figure	Volume	Area
1. 47ft 13ft		Lateral Area: Total Area:
2. 24ft 2ft		Lateral Area: Total Area:
3. 5in 1in		Lateral Area: Total Area:

Cones Practice

| Figure	Volume	Area
1. 17in, 8in		Lateral Area: Total Area:
2. 24ft, 20ft		Lateral Area: Total Area:
3. 12cm, 5cm		Lateral Area: Total Area:

Day 4 Notes – Similar Solids

Theorem 12-1

If the scale factor of two similar solids is a:b, then

1. The ratio of their perimeters is a:b.

2. The ratio of their base areas, lateral areas, and total areas is $a^2:b^2$.

3. The ratio of their volumes is $a^3:b^3$

Given the solids, determine the ratio of their totals areas and their volumes.

Example 1:

6

10
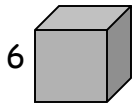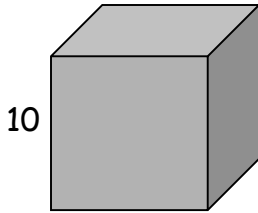
Cubes

All cubes are _____.

Scale Factor: _____

Ratio of Total Areas: _____

Ratio of Volumes: _____

Example 2:

Similar Cylinders

3

2

Scale Factor: _____

Ratio of Total Areas: _____

Ratio of Volumes: _____

Example 3:   All spheres are _____.

8

2

Spheres

Scale Factor: _____

Ratio of Total Areas: _____

Ratio of Volumes: _____

1.)

2.)

3.)

Day 4 Practice

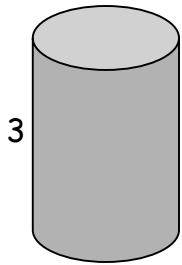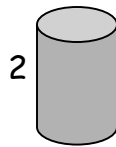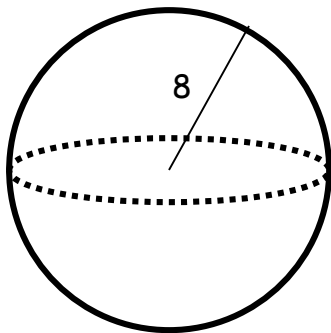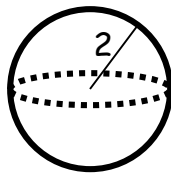1. Two similar polygons have a scale factor of 3:5. What is the ratio of the perimeters? What is the ratio of the areas?

2. Two circles have radius lengths 4 and 12. What is the scale factor? What is the ratio of circumferences? What is the ratio of areas?

3. The ratio of areas of two squares is 9:16. What is the ratio of their perimeters? What is the ratio of their side lengths?

4. The ratio of areas of two similar polygons is 9:625. The perimeter of the smaller polygon is 12. What is the perimeter of the larger polygon?

5. The ratio of perimeters of two similar polygons is 4:15. The area of the larger polygon is 64. What is the area of the smaller polygon?

6. Two similar solids have a scale factor of 3:7. What is the ratio of their lateral areas? What is the ratio of their total areas? What is the ratio of their volumes?

7. Two spheres have diameters with lengths 10 and 20. What is the ratio of their radii? What is the ratio of their circumferences? What is the ratio of their total areas? What is the ratio of their volumes?

8. The ratio of volumes of two cubes is 27:2744. What is the scale factor? What is the ratio of lateral areas? What is the ratio of total areas? What is the perimeter of the base of the larger cube?

9. The ratio of lateral areas of two similar solids is 25:36. What is the ratio of their volumes?

10. The ratio of total areas of two similar solids is 64:81. If the volume of the smaller solid is 1024, what is the volume of the larger solid?

11. The ratio of volumes of two similar solids is 1:729. The lateral area of the larger solid is 324, what is the lateral area of the smaller solid?