Name: _____

Unit 2 – Measurement

2.8 – Surface Area

- a ***POLYGON*** is a closed figure formed by three or more line segments (it is 2-dimensional)

  e.g. triangles, squares, rectangles, etc.

- a ***POLYHEDRON*** is a 3-dimensional figure with polygons as faces

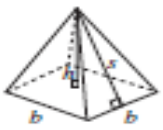
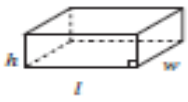
  e.g. prisms and pyramids

- the ***SURFACE AREA*** of an object is the **TOTAL** area of all the **SURFACES** of the 3D object.

- surface area is measured in $\boldsymbol{units^2}$ **e.g.** cm^2, ft^2, m^2, in^2, etc.

- a ***NET*** is a pattern for a polyhedron obtained by cutting the polyhedron along some of its edges and it laying it flat. In other words, it is a 2-dimensional representation of a 3-dimensional object

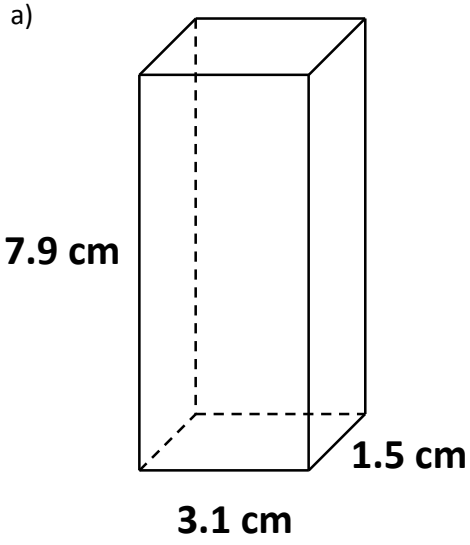
- use the following formulae sheet to calculate the surface area of any regular object

Geometric Figure	Surface Area
Cylinder 	$A_{top} = \pi r^2$ $A_{base} = \pi r^2$ $A_{side} = 2\pi rh$ $SA = 2\pi r^2 + 2\pi rh$
Sphere 	$SA = 4\pi r^2$ **or** $SA = \pi d^2$
Cone 	$A_{side} = \pi rs$ $A_{base} = \pi r^2$ $SA = \pi r^2 + \pi rs$
Square-Based Pyramid 	$A_{triangle} = \frac{1}{2}bs$ (for each triangle) $A_{base} = b^2$ $SA = 2bs + b^2$
Rectangular Prism 	$SA = wh + wh + lw + lw + lh + lh$ **or** $SA = 2(wh + lw + lh)$
General Right Prism	SA = the sum of the areas of all the faces
General Pyramid	SA = the sum of the areas of all the faces

Note: Use the value of π programmed in your calculator rather than the approximation of 3.14.

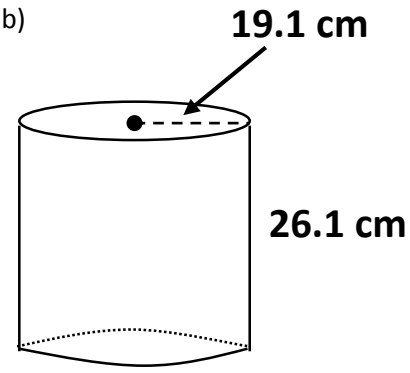
EXAMPLES: Draw a **NET** and calculate the **SURFACE AREA** for each of the figures shown below.

a)

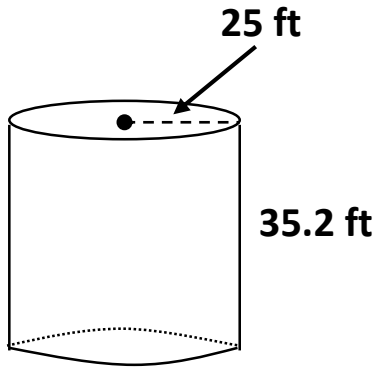


Name of Polyhedron: _____

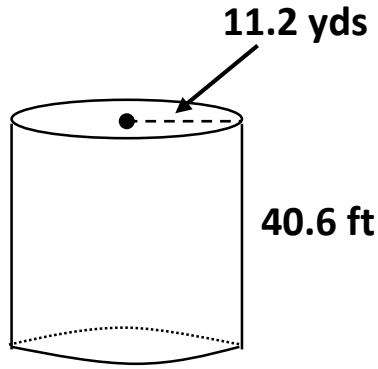
b)



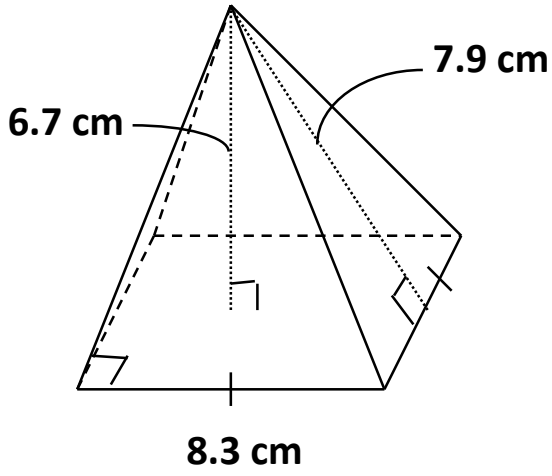
Name of Polyhedron: _____

c) 

Name of Polyhedron: _____

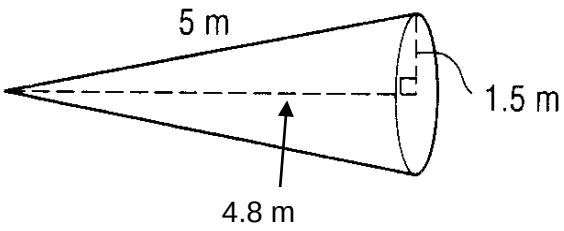
d) 

Name of Polyhedron: _____

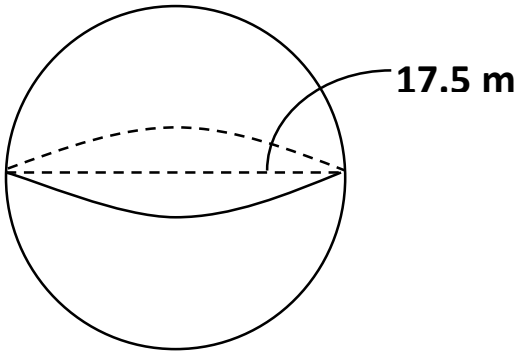
e) 

Name of Polyhedron: _____

f) **Name of Polyhedron: _____**



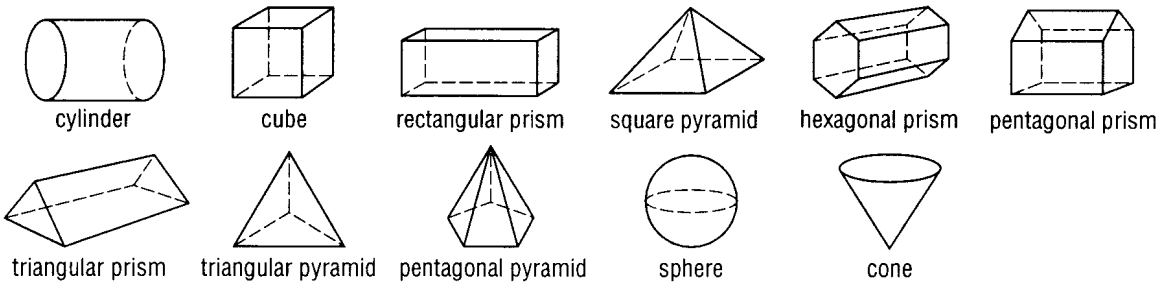
e) **Name of Polyhedron: _____**



Assignment

PART 1 – Three-Dimensional Solids

There are many different three-dimensional shapes in a set of geometric solids.



A **polyhedron** is a three-dimensional figure with faces that are polygons.

Use the solids shown at the top of the page to list the following.

1. all the solids with at least one rectangular or square face

_____

2. all the solids with no triangular faces

_____

3. all the solids with at least one circular face

_____

4. all the solids with more than 5 flat faces

_____

Name the geometric solid suggested by each object.

5. 

_____

6. 

_____

7. 

_____

8. 

_____

9. 

_____

10. 

_____

Sketch a three-dimensional figure for each description. Name each figure.

11. 6 rectangular faces

_____

12. 5 triangular faces, 1 pentagonal face

_____

13. 2 triangular faces, 3 rectangular faces

_____

14. 4 triangular faces

_____

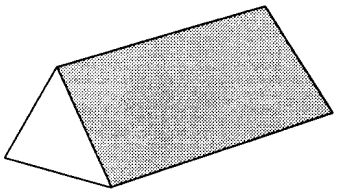
15. a) Describe how a prism and a pyramid are different.

_____

b) Describe how they are alike.

_____

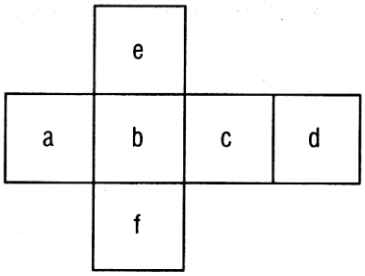
16. Show on the diagram how four identical triangular prisms can be used to form another triangular prism.

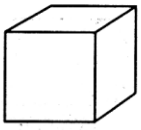


PART 2 – Surface Areas of Polyhedra

The **surface area** of a figure is the sum of the areas of all its faces.

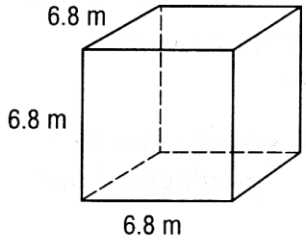
surface area = areas of a + b + c + d + e + f



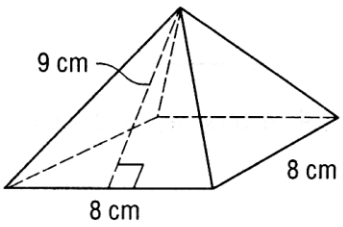


Draw the net. Then, estimate and calculate the surface area of each polyhedron.

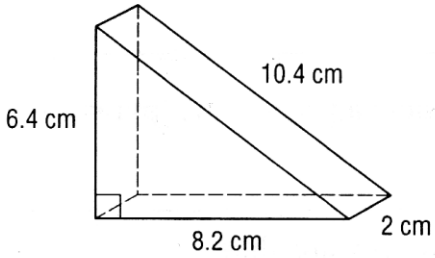
1.



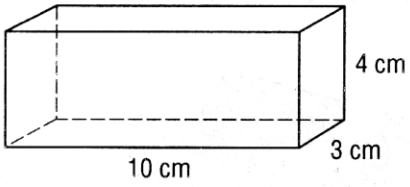
2.



3.

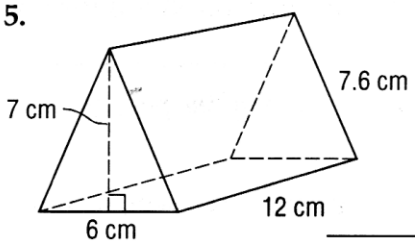


4.

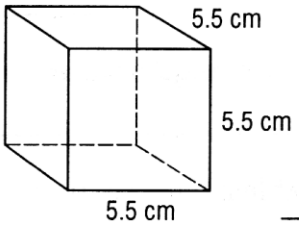


Calculate the surface area.

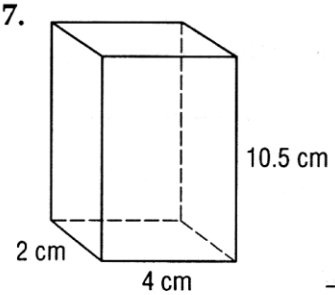
5.



6.



7.



8. A box of facial tissues is 22 cm by 10.5 cm by 8 cm. How much cardboard is on the outside surface?

9. A storage box is 60 cm long, 45 cm wide, and 30 cm high. The lid is 10 cm high. What is the surface area of the box and its lid?