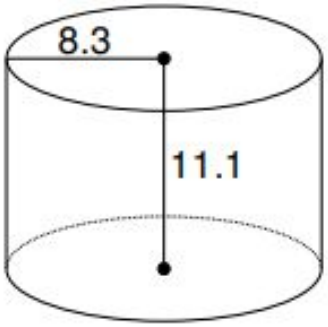
IM2 Problem Set 1.10 - Further Properties of Geometric Figures & Introduction to 3D Shapes

BIG PICTURE of this UNIT:	• mastery with linear algebraic skills to be used in our work with coordinate geometry (midpoint, length, slope) • understanding various geometric properties of quadrilaterals, triangles & circles • how do you really "prove" that something is "true"? • introduction to working with 3D shapes

Part 1 - Skills Review

1. Find the volume and surface area of the circular prism shown.



2. Determine the surface area and volume of sphere whose radius is 5 cm.

3. Find the intersection of the following 2 lines: $4x + y = -3$ and $3x - 2y = 17$.

Part 2 – Skills & Concept REVIEW/EXPLORATION

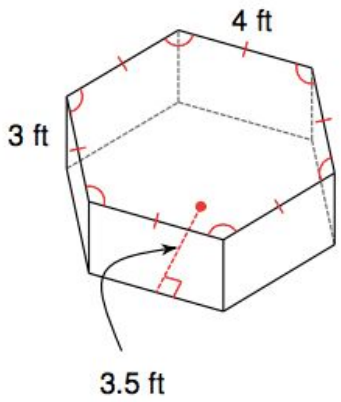
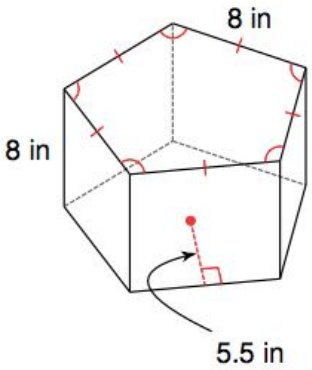
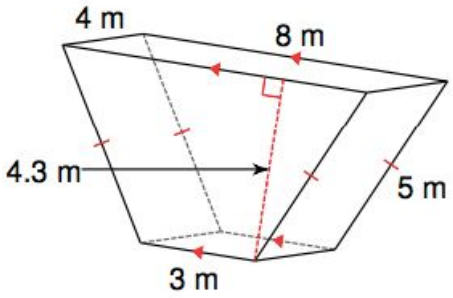
1. Show that the midsegments of a quadrilateral with vertices at $P(-2, -2)$, $Q(0, 4)$, $R(6, 3)$, and $S(8, -1)$ form a rhombus.

2. Show that the midsegments of a rhombus with vertices at $R(-5, 2)$, $S(-1, 3)$, $T(-2,-1)$, and $U(-6,-2)$ form a rectangle.

3. A quadrilateral has vertices at $A(-2, 3)$, $B(-2, -2)$, $C(2, 1)$, and $D(2, 6)$. Show that the quadrilateral is a rhombus.

Part 3 – NEW Skills & PRACTICE

1. ***Prisms*** are 3D figures that have congruent sides, and a solid base, which is either of two parallel ends on the figure. Find the volume and surface area of each of the following prisms:

	
	A trapezoidal prism of height 6 km. The parallel sides of the base have lengths 5 km and 3 km. The other sides of the base are each 2 km. The trapezoid's altitude measures 1.7 km.

2. Solve for the unknown in each of the following prisms:

    a. Bill wants to build a rectangular tub that is 2 ft high and holds 180 ft^3 of water.
        i. What is the base area of the tub?
        ii. What could be three possible dimensions of the base of the tub, given your answer to i.?

    b. The volume of a cylinder is 904 $in.^3$. and its radius is 5 in. Find the height of the cylinder to the nearest ten and hence, find its surface area.

    c. The volume of a rectangular prism is 1050 cm^3. If the width of the prism is 10 cm and the height is 7 cm, then find the length of the rectangular prism. Hence determine its surface area.

3. Working with Spheres. NOTE: **Give your answers to the same number of decimal places as in the original measurements.**

    a. Calculate the surface area and volume of a tennis ball with a radius of 3.0 cm.
    b. Calculate the surface area and volume of the beach ball whose diameter is 110 cm.
    c. Calculate the surface area of a soccer ball with a radius of 12.000 cm. Explain what you did.
    d. Calculate how much water you would need to fill a round water balloon with a radius of 5.00 cm.