

Due: 4/18/17 at 5:00PM

Instructions: Your answers to the following questions do not need to be lengthy or written in complete sentences, but should reflect preparation for our discussion about Chapter 11 at the beginning of class.

Questions:

1. What is Euler's formula, and what does it mean?

Euler's formula is $F + V = E + 2$. It means that in any polyhedron, the sum of the number of faces (F) and the number of vertices (V) is two more than the number of edges (E).

2. Which solids among prisms, cylinders, pyramids, cones, and spheres are polyhedra? Explain.

Prism and pyramids are polyhedra because all of their faces are polygons. Cylinders, cones, and spheres are not polyhedra because they contain curved surfaces.

3. How are prisms and cylinders similar? How are they different?

Similar: Both have two parallel congruent faces.

Different: The bases of a prism are polygons, while the bases of a cylinder are circles. The lateral faces of a prism are rectangles, while the lateral surface of a cylinder is a single curved surface.

4. What is the difference between the lateral area and the surface area of a prism or cylinder?

The lateral area is the sum of the areas of all the lateral faces, which are all faces except the bases. The surface area is the sum of all the faces, including both the lateral faces and the two bases.

5. Why does the formula for the surface area of a regular pyramid contain the slant height of the pyramid rather than the height?

The surface area of a pyramid is the sum of the area of the base and the areas of the triangular lateral faces. The slant height of a regular pyramid is the length of the altitudes of the triangular faces, so is used to calculate their area.

6. How are pyramids and cones similar? How are they different?

Similar: Both have one face and a vertex. Both have slant heights.

Different: The base of a pyramid is a polygon, while the base of a cone is a circle. The lateral faces of a pyramid are triangles, while the lateral surface of a cone is a single curved surface.

7. A rectangular prism (or box) has three pairs of opposite congruent faces that are rectangles. Which of these should be used as the bases to calculate the surface area and volume? Explain.

Any of the three pairs of opposite faces can be chosen as the bases. Any of these three choices will give the same results for the surface area and volume of the prism.

8. What single formula can be used to calculate the volume of both a pyramid and a cone?

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

9. A tetrahedron is a triangular pyramid all of whose faces are congruent equilateral triangles. How many faces does a tetrahedron have, and which one should be used to calculate its surface area and volume?

A tetrahedron has four faces. Any of these four faces can be used as the base, as all choices will give the same results for the surface area and volume.

10. For which of the solids you have studied in this chapter do you need to use π in the calculation of the surface area and volume? What is an easy way to remember which ones these are?

A cylinder, cone, and sphere involve circular bases and/or curved surfaces, so π is involved in calculating their surface areas and volumes. Prisms and pyramids are made up only of polygons, so π is not involved.

Muddiest Point:

What questions do you have about the notes you took in Chapter 11, or anything from this week?



MML Homework Questions:

Are there any MML homework problems from Chapter 11 that you would like to discuss?