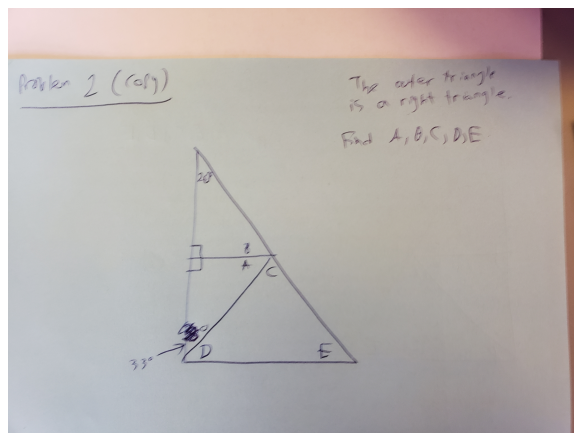


MATH 113 SPRING 2023 SHAPE REVIEW DAY PROBLEMS

0.1. **Problem 1.** As a class list out the major topics covered in this unit, and group them together however you want, to help organize your studying. Maybe have one person act as a scribe on the board.



0.2. **Problem 2.**

0.3. **Problem 3.** Can a cube have equal surface area and volume? If so, what would the side length have to be? *Hint:* take formulas for surface area and volume and set them equal to each other. You'll get an equation you can solve for the side length.

0.4. **Problem 4.** Your new swimming pool is a cylinder with radius 20 feet and depth 5 feet.

- If you need tile around the sides and the bottom, how many square feet of tile do you need?
- What is the volume of water needed to fill the pool?

0.5. **Problem 5.** A certain percentage of a sphere is cut away. The initial sphere has radius 10, and the volume of the remainder of the sphere is 100π . What percentage of the original sphere remains?

0.6. **Problem 6.** If a graph has 12 vertices and 15 faces, how many edges must it have?

0.7. **Problem 7.** My travel itinerary for the Thanksgiving holiday in 2021 was as follows: fly from Knoxville to Atlanta, then Atlanta to Pittsburgh. At the end of the holiday, drive from Pittsburgh to Latrobe, then fly from Latrobe to Fort Lauderdale, then Fort Lauderdale to Knoxville.

- Draw a graph representing my travel itinerary.
- Give an example of an Euler circuit on the graph that you drew.

0.8. **Problem 8.** Draw a labyrinth Jordan Curve and two dots that are on opposite sides of the labyrinth.

0.9. **Problem 9.** Draw a squiggle with at least 5 vertices. Trade with someone sitting near you, and show that your classmate's squiggle satisfies the Euler Characteristic Theorem. Find E, V, F and write those values down. Label the picture as much as you feel is necessary.

0.10. **Problem 10.** Make a table indicating the different types of curvature. In it, distinguish between:

- Intrinsic vs. extrinsic curvature
- Positive, negative, and zero curvature

This table will make for a useful study resource once it's complete.

0.11. **Problem 11.** Balloons provided in class

a. Inflate one round balloon. Draw one small triangle on the round balloon. Use the protractor to measure, in degrees, each interior angle of your triangle. Add up the three angle measures, and enter their sum.

b. Now draw one large triangle on the round balloon. Use the protractor to measure each interior angle of your triangle. Add up the three angle measures and enter their sum below.