Name _____   Date _____

1. Is it possible to draw two different triangles that both have angle measurements of 40° and 50° and a side length of 5 cm? If it is possible, draw examples of these conditions, and label all vertices and angle and side measurements. If it is not possible, explain why.

2. In each of the following problems, two triangles are given. For each: (1) State if there are sufficient or insufficient conditions to show the triangles are identical, and (2) explain your reasoning.
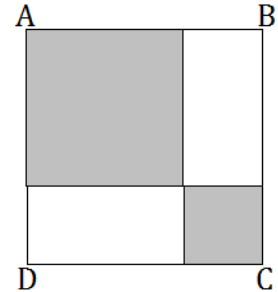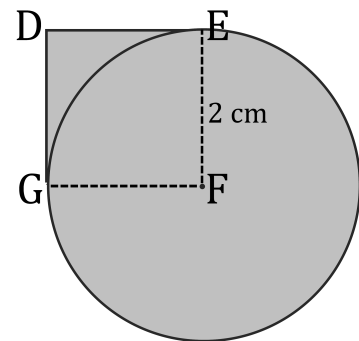
    a.
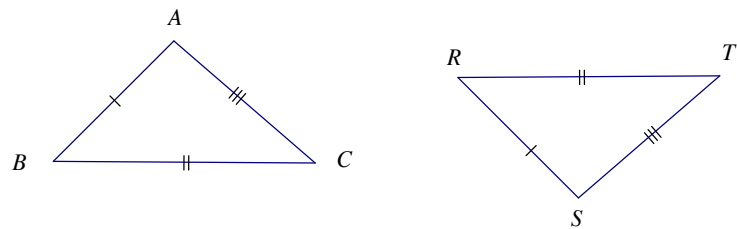
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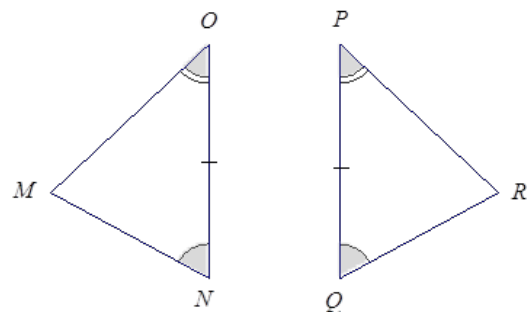
3. In the following diagram, the length of one side of the smaller shaded square is $\frac{1}{3}$ the length of square $ABCD$. What percent of square $ABCD$ is shaded? Provide all evidence of your calculations.


4. Side $\overline{EF}$ of square $DEFG$ has a length of 2 cm and is also the radius of circle F. What is the area of the entire shaded region? Provide all evidence of your calculations.

5. For his latest design, a jeweler hollows out crystal cube beads (like the one in the diagram) through which the chain of a necklace is threaded. If the edge of the crystal cube is 10 mm, and the edge of the square cut is 6 mm, what is the volume of one bead? Provide all evidence of your calculations.


10 mm

6 mm
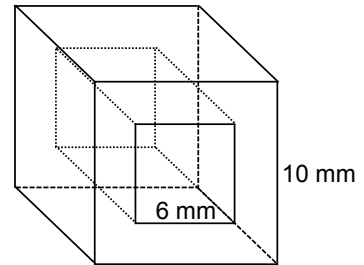
6. John and Joyce are sharing a piece of cake with the dimensions shown in the diagram. John is about to cut the cake at the mark indicated by the dotted lines. Joyce says this cut will make one of the pieces three times as big as the other. Is she right? Justify your response.

10 cm

5 cm

2.5 cm

6 cm

6 cm
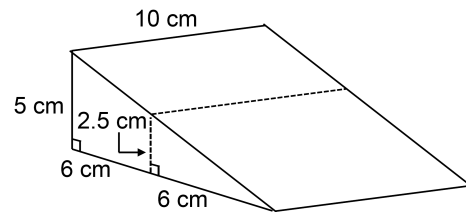
8. A tank measures 4 ft. in length, 3 ft. in width, and 2 ft. in height. It is filled with water to a height of 1.5 ft. A typical brick measures a length of 9 in., a width of 4.5 in., and a height of 3 in. How many whole bricks can be added before the tank overflows? Provide all evidence of your calculations.

9. Three vertical slices perpendicular to the base of the right rectangular pyramid are to be made at the marked locations: (1) through $\overline{AB}$, (2) through $\overline{CD}$, and (3) through vertex E. Based on the relative locations of the slices on the pyramid, make a reasonable sketch of each slice. Include the appropriate notation to indicate measures of equal length.
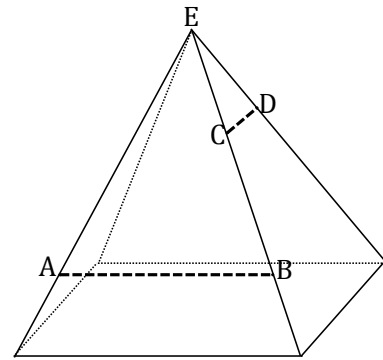
(1) Slice through $\overline{AB}$	(2) Slice through $\overline{CD}$	(3) Slice through vertex E

10. Five three-inch cubes and two triangular prisms have been glued together to form the composite three-dimensional figure shown in the diagram. Find the surface area of the figure, including the base. Provide all evidence of your calculations.

3 in

5 in

4 in

5 in

4 in