EUREKA MATH™ TIPS FOR PARENTS

KEY CONCEPT OVERVIEW

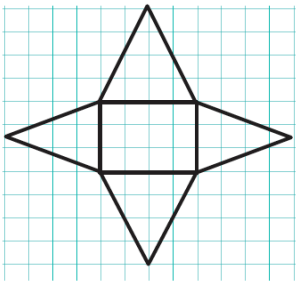
In this topic, students use **nets** to create three-dimensional (solid) figures. They identify the net that matches the corresponding solid figure (prism or pyramid). They also construct the net for a particular figure, given its dimensions. The topic wraps up as students extend their knowledge of nets to find the **surface areas** and volumes of three-dimensional figures.

You can expect to see homework that asks your child to do the following:

- Match a net to the picture of its solid and write the name of the solid.
- Sketch various nets that can fold into a cube.
- Given a net, classify the solid as a prism (two bases, rectangular side faces) or a pyramid (one base, triangular side faces that meet at a vertex) and write the name of the solid (e.g., cube or rectangular pyramid).
- Given a figure or its dimensions, sketch and label the net and the edge lengths.
- Given a net, name the corresponding solid, and then write and evaluate the expression for surface area. (See Sample Problems.)
- Use the formula $SA = 2lw + 2lh + 2wh$ to calculate the surface area of a right rectangular prism and the formula $SA = 6s^2$ to calculate the surface area of a cube.
- Solve real-world problems involving surface area and volume.

SAMPLE PROBLEMS *(From Lessons 17 and 19)*

1. Name the solid the net would create, write an expression for surface area, and evaluate. Assume that each box on the grid paper represents a 1 cm × 1 cm square. Explain how the expression represents the figure.



Name of shape: rectangular pyramid

Surface area expression: $(3\text{ cm} \times 4\text{ cm}) + 2\left(\frac{1}{2} \times 4\text{ cm} \times 4\text{ cm}\right) + 2\left(\frac{1}{2} \times 4\text{ cm} \times 3\text{ cm}\right)$

Evaluation: $12\text{ cm}^2 + 2(8\text{ cm}^2) + 2(6\text{ cm}^2) = 40\text{ cm}^2$

The surface area is 40 cm^2***. The figure has 1 rectangular base that measures 3 cm × 4 cm, 2 triangular faces with bases of 4 cm and heights of 4 cm, and 2 other triangular faces with bases of 3 cm and heights of 4 cm.***

2. The Quincy Place housing development plans to add a full-sized neighborhood pool. In preparing the budget, Quincy Place determined that it is also possible to install a baby pool requiring less than 15 cubic feet of water. Quincy Place has three different baby pool models to choose from.

Choice one:	Choice two:	Choice three:
5 ft. × 5 ft. × 1 ft.	4 ft. × 3 ft. × 1 ft.	4 ft. × 2 ft. × 2 ft.

Which baby pool is best? Why are the others not good choices?

Choice one volume: $5\text{ ft.} \times 5\text{ ft.} \times 1\text{ ft.} = 25\text{ ft}^3$

Choice two volume: $4\text{ ft.} \times 3\text{ ft.} \times 1\text{ ft.} = 12\text{ ft}^3$

Choice three volume: $4\text{ ft.} \times 2\text{ ft.} \times 2\text{ ft.} = 16\text{ ft}^3$

Choice two is within the budget because it holds less than 15 cubic feet of water. The other two choices require larger volumes than Quincy Place can afford.

Additional sample problems with detailed answer steps are found in the *Eureka Math Homework Helpers* books. Learn more at GreatMinds.org.

HOW YOU CAN HELP AT HOME

You can help at home in many ways. Here are some tips to help you get started.

- With your child, sketch three different nets for a cube. (There are 11 possible nets, but Figure 1 shows a few correct answers.)

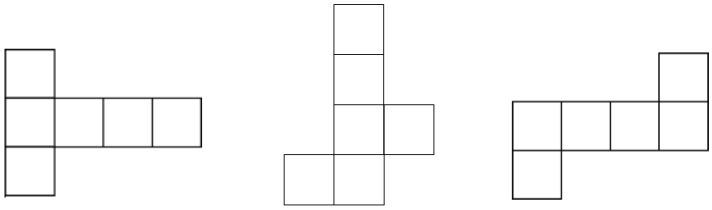


Figure 1

- Discuss with your child why Figure 2 is *not* a net for a cube. (The net shown does not represent a cube because all of the faces are not squares. This net is for a right rectangular prism.)

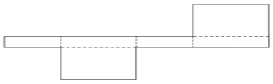


Figure 2

- Byron identified the length, width, and height of Figure 3 as 12 in., 2 in., and 3 in., respectively.

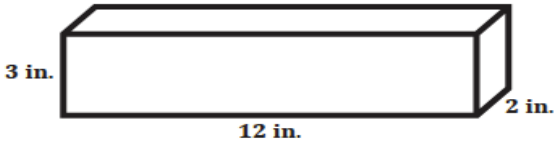
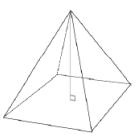


Figure 3

Ask your child to use Byron's dimensions to calculate the surface area of the figure using the formula $SA = 2lw + 2lh + 2wh$. ($SA = 2(12 \text{ in.})(2 \text{ in.}) + 2(12 \text{ in.})(3 \text{ in.}) + 2(2 \text{ in.})(3 \text{ in.}) = 132 \text{ in.}^2$) Then point out that the equation $SA = 2(2 \text{ in.})(12 \text{ in.}) + 2(2 \text{ in.})(3 \text{ in.}) + 2(12 \text{ in.})(3 \text{ in.})$ results in the same answer for the surface area. Ask your child to explain why. (The length, width, and height were identified as 12 in., 2 in., and 3 in., respectively, but the answer is still correct because it also combines the areas of all six sides.)

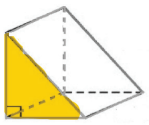
TERMS

Net: The flat, two-dimensional figure that can be folded to form a three-dimensional figure. (See Sample Problem 1 and first bullet in How You Can Help At Home.)



Rectangular pyramid: A three-dimensional shape that has a rectangular base and triangular faces that meet at the apex, which is the point, or vertex, farthest from the base.

Surface area: The measure of the total area occupied by the surface (outside) of a three-dimensional object. It is measured in square units.



Surface of a prism or pyramid: The collection of all the faces of a prism or pyramid. (One face is shown in yellow to the right.) For example, the five faces of a triangular prism form its surface.