

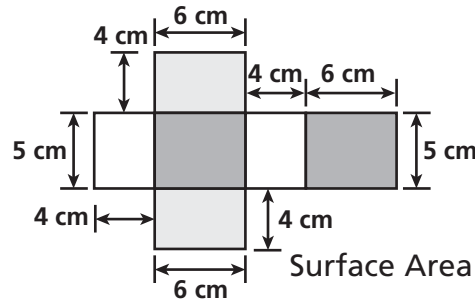


Content Overview

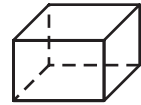
Dear Family,

In this unit, students are studying the surface area of prisms and pyramids. **Surface area** is the sum of the areas of all the faces of a geometric figure. Your student will make nets to visualize the parts that make up the surface area of a prism or pyramid and learn a systematic approach to finding the total surface area of the solid figure.

Rectangular Prism Net



Rectangular Prism



$$\begin{aligned} \text{Surface Area} &= 2(6 \times 5) + 2(4 \times 5) + 2(6 \times 4) \\ &= 60 + 40 + 48 = 148 \end{aligned}$$

Surface Area is 148 cm²

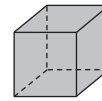
The types of prisms and pyramids that students will be calculating the surface areas for are shown below.



triangular prism



rectangular prism



cube



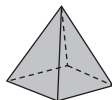
pentagonal prism



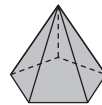
hexagonal prism



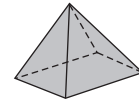
octagonal prism



square pyramid



pentagonal pyramid



rectangular pyramid



triangular pyramid

Students will also explore real-life applications of surface area.

If you need practice materials or if you have any questions, please call or write to me.

Sincerely,
Your child's teacher



CA CC

Unit 4 addresses the following standards from the *Common Core State Standards for Mathematics with California Additions*: **6.G.1, 6.G.4, 6.EE.2, 6.EE.2c**, and all Mathematical Practices.



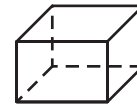
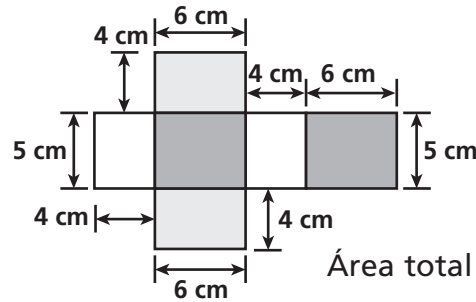
Un vistazo general al contenido

Estimada familia,

En esta unidad, los estudiantes aprenderán a calcular el área total de los prismas y las pirámides. El **área total** es la suma de las áreas de las caras de una figura geométrica. Los estudiantes harán plantillas para visualizar las partes que forman el área total de un prisma o una pirámide y aprenderán un método para hallar la superficie total del cuerpo geométrico.

Plantilla de prisma rectangular

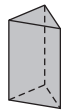
Prisma rectangular



$$\begin{aligned} \text{Área total} &= 2(6 \times 5) + 2(4 \times 5) + 2(6 \times 4) \\ &= 60 + 40 + 48 = 148 \end{aligned}$$

$$\text{El área total es} = 148 \text{ cm}^2$$

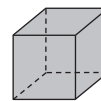
Los estudiantes calcularán el área total de los tipos de prismas y pirámides que se muestran abajo.



prisma triangular



prisma rectangular



cubo



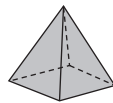
prisma pentagonal



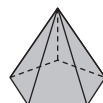
prisma hexagonal



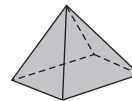
prisma octagonal



pirámide cuadrangular



pirámide pentagonal



pirámide rectangular



pirámide triangular

Los estudiantes también explorarán situaciones de la vida real en las que se aplica lo que han aprendido acerca del área total.

Si necesita materiales para practicar o si tiene preguntas, por favor comuníquese conmigo.

Sinceramente,
El maestro de su hijo



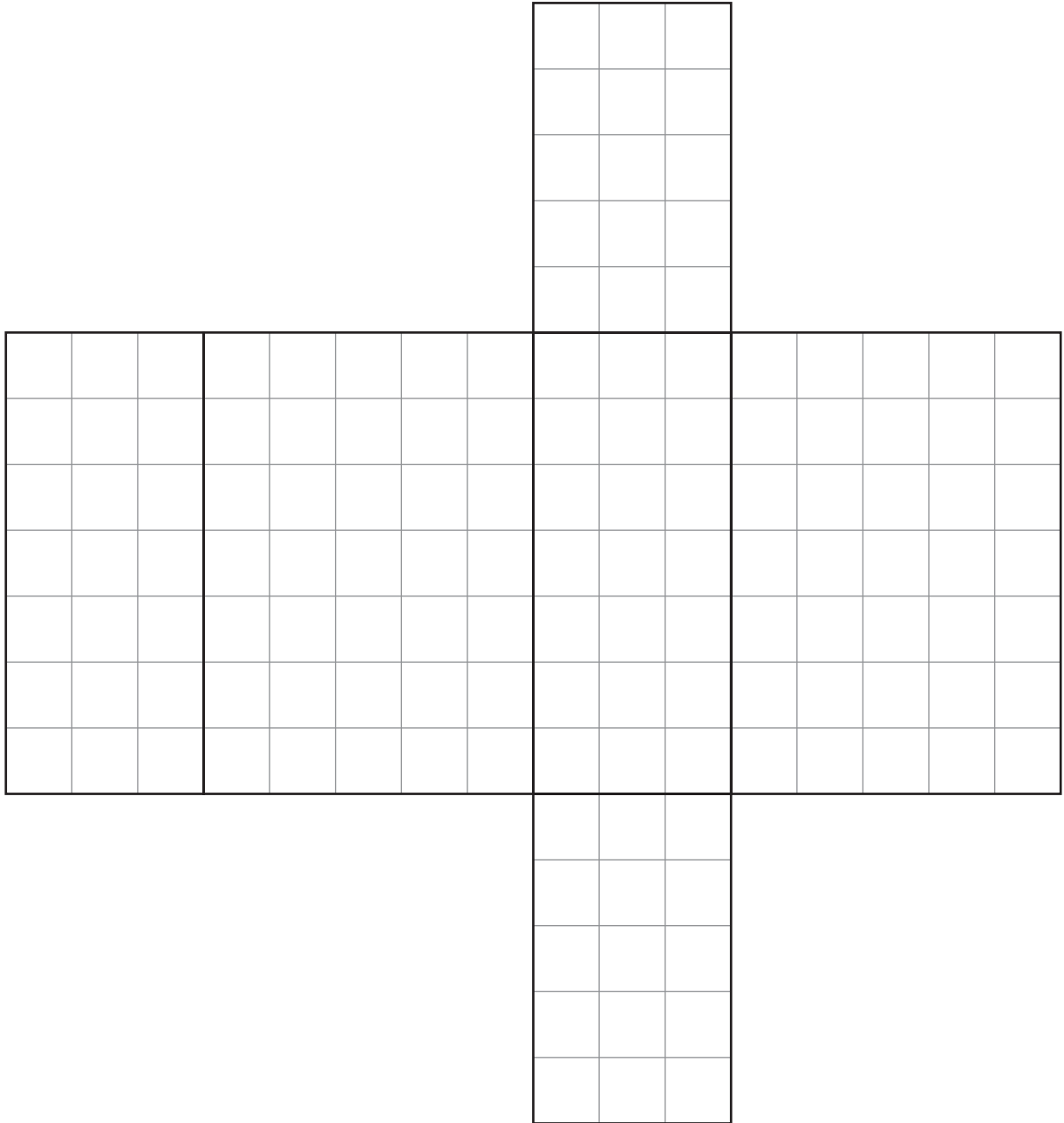
CA CC

En la Unidad 4 se aplican los siguientes estándares auxiliares, contenidos en los *Estándares estatales comunes de matemáticas con adiciones para California*: **6.G.1, 6.G.4, 6.EE.2, 6.EE.2c**, y todos los de prácticas matemáticas.

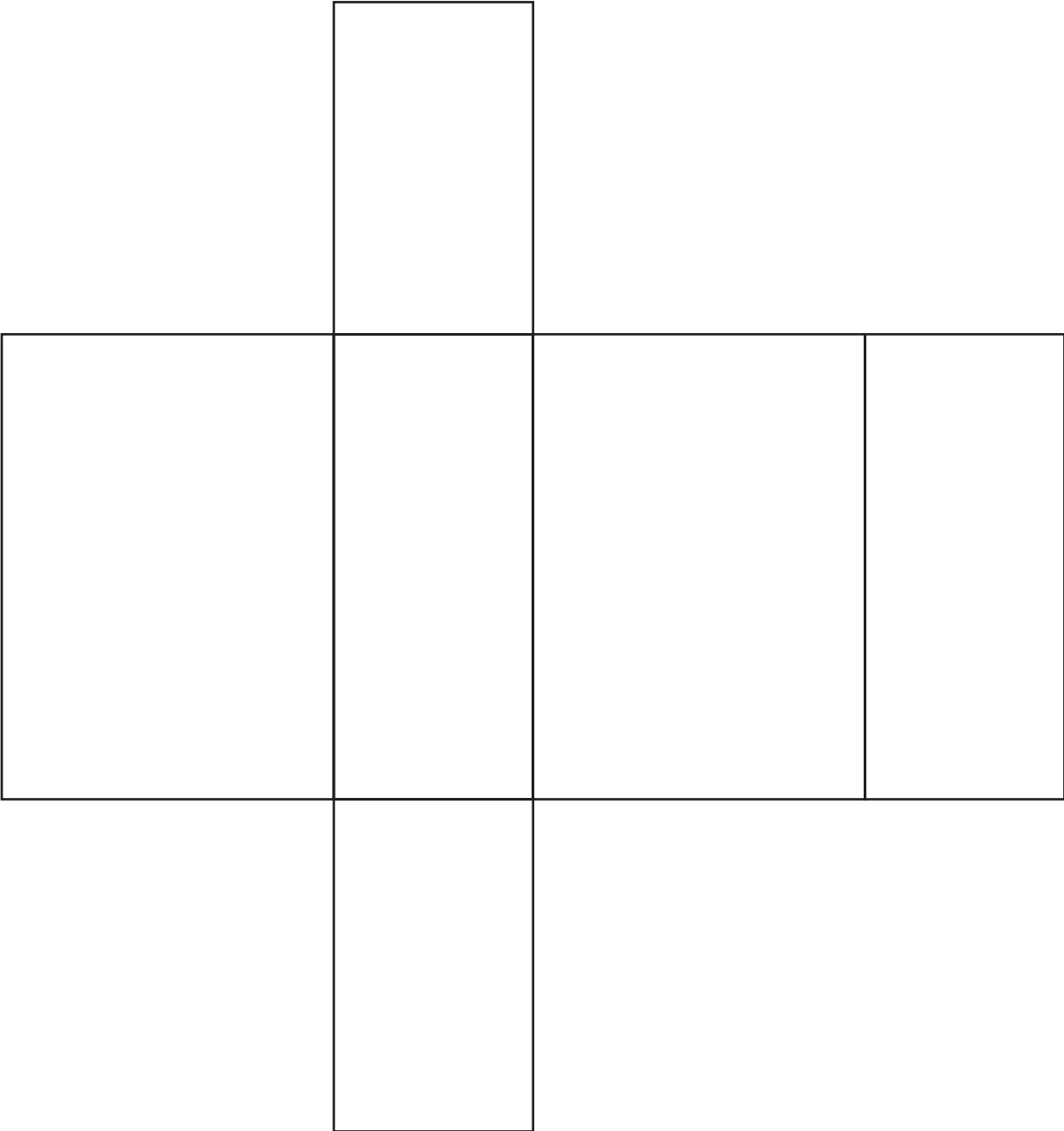
► Rectangular Prism Net

A **net** is a two-dimensional flat pattern that can be folded into a three-dimensional figure.

Cut out the net and form the solid figure.



► Rectangular Prism Net (continued)



Vocabulary

prism
face
rectangular prism
base
lateral face
edge
vertex

► Make a Rectangular Prism from a Net



1. The flat rectangular sides of a **prism** are called **faces**.
How many faces does a **rectangular prism** have?

2. Two parallel faces of a prism are called **bases**.
What shape are the bases of a rectangular prism?

3. The faces that are not bases are called **lateral faces**.
What shape are the lateral faces?

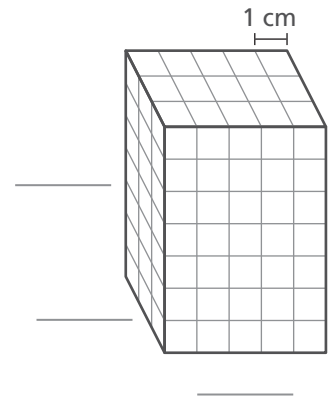
Place your rectangular prism in the same position as shown in the picture below on the right.

Use your rectangular prism to answer questions 4–6.

4. What are the dimensions of the bases of your rectangular prism?

5. What are the dimensions of the lateral faces?

6. Record the dimensions of the prism you made on the picture at the right.

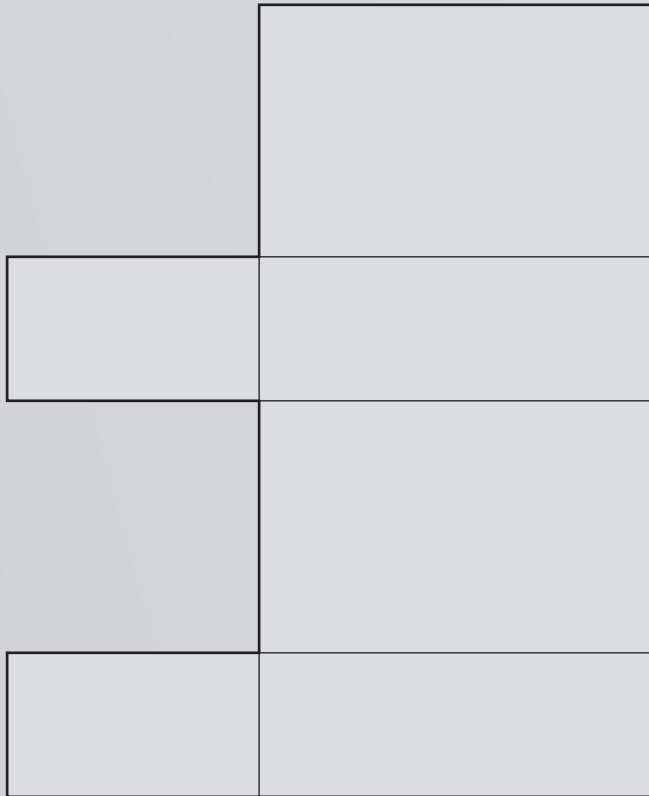




► What's the Error?

Dear Math Students,

Today I made this net for a rectangular prism. Before I trace this net on cardboard, can you tell me if the net will form a rectangular prism? If not, can you tell me what I did wrong?



Your friend,

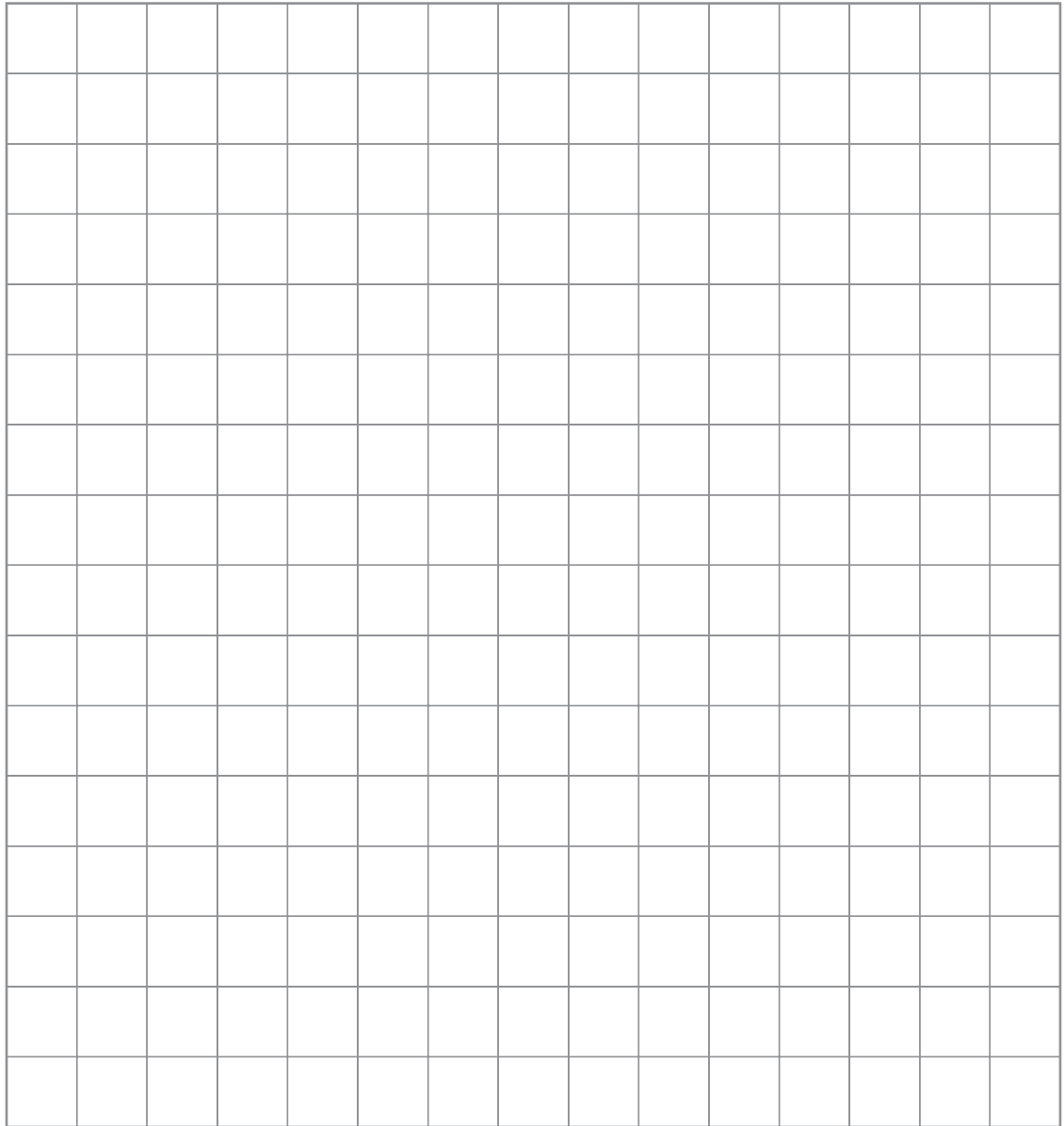
Puzzled Penguin



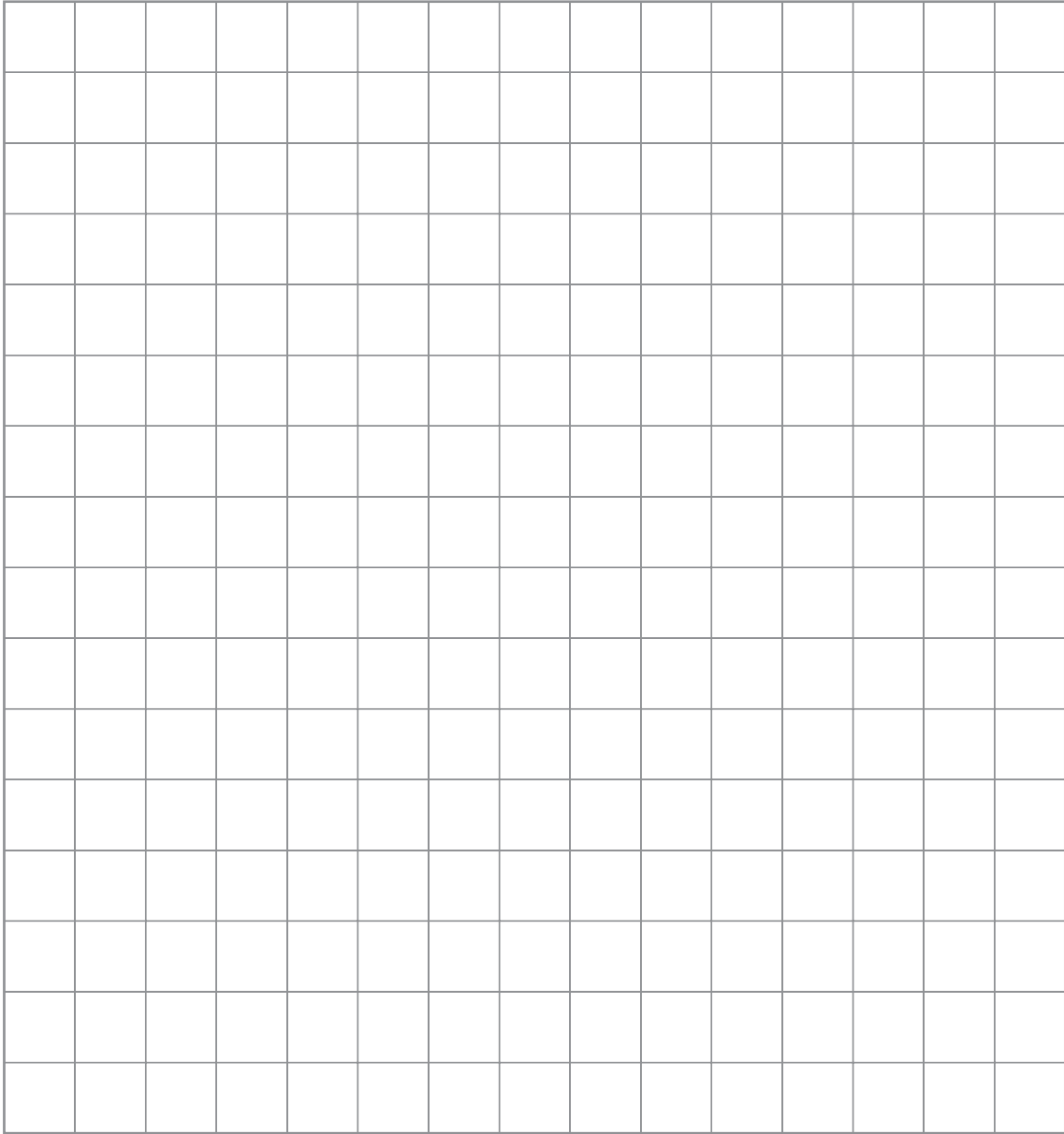
7. Write a response to the Puzzled Penguin.

► Draw a Net for a Rectangular Prism

Draw a net for a rectangular prism. Then cut out the net and form a rectangular prism.



► Draw a Net for a Rectangular Prism (continued)

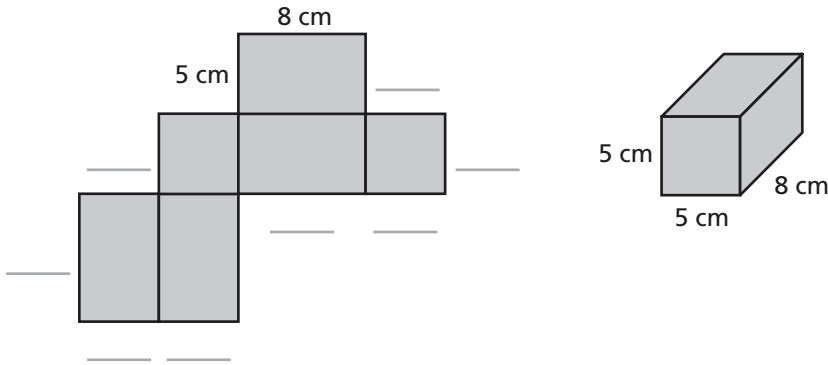




► Find Surface Area Using Nets

The net on the left forms the rectangular prism on the right. Fill in the missing dimensions. Then find the **surface area** of each rectangular prism.

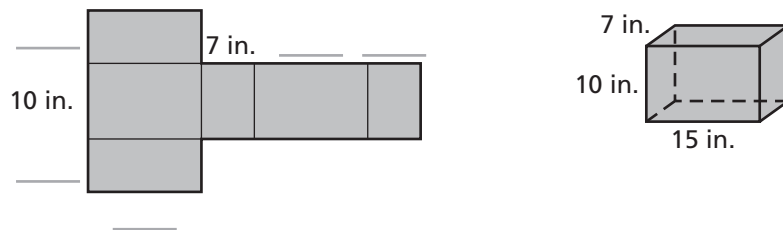
8.



Area of a square base: _____ Area of a rectangular face: _____

Surface area: _____

9.



Area of top rectangular face: _____

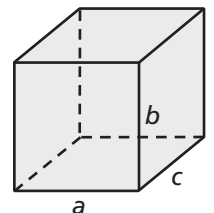
Area of side rectangular face: _____

Area of front rectangular face: _____

Surface area: _____

10. How can you find the surface area of any rectangular prism?

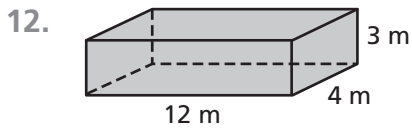
11. Use the rectangular prism at the right to write an expression to show how you can find the surface area of any rectangular prism.

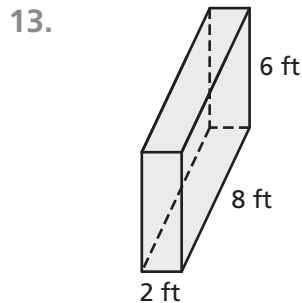


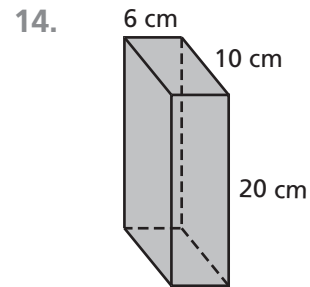


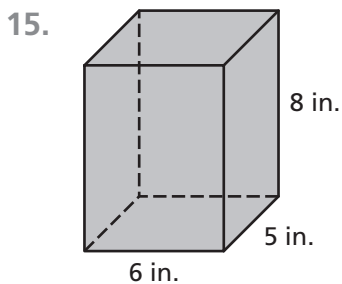
► Find Surface Area

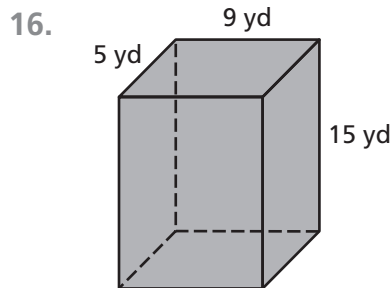
Find the surface area.

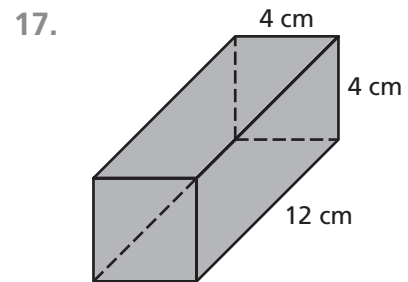












Solve.

18. Jenna wants to paint a wooden jewelry box that is 8 inches by 6 inches by 3 inches with clear paint. The bottle of paint says it will cover a total area of 250 square inches. Does she have enough to cover the entire box? Explain.

19. Rico is making a rectangular paper lantern that is 28 cm by 15 cm by 12 cm. He plans to cover the faces of the lantern with paper that comes in sheets that have an area of 9 cm^2 and cost \$0.08 a sheet. How much will it cost to cover the six faces of the lantern?

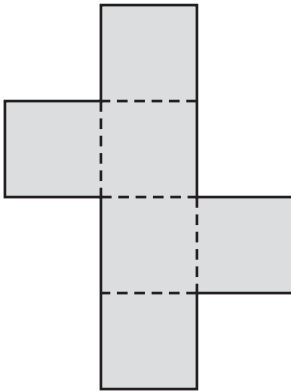
Show your work

► Identify Cube Nets

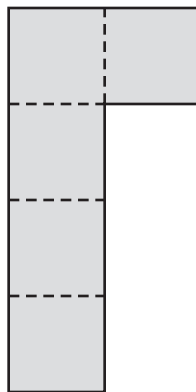
A **cube** is a rectangular prism that has six congruent square faces.

Put a check mark next to each net that will form a cube. Fix the other nets so they will form a cube.

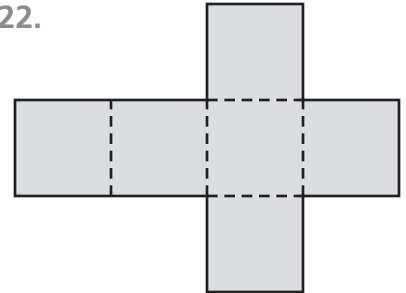
20.



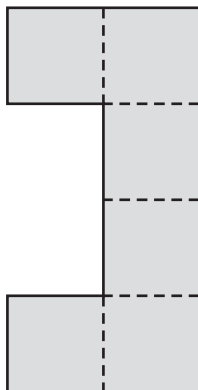
21.



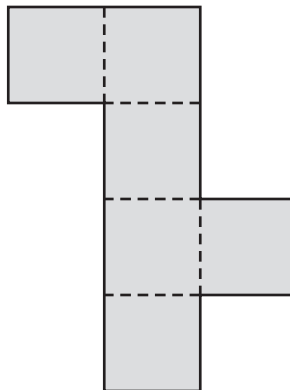
22.



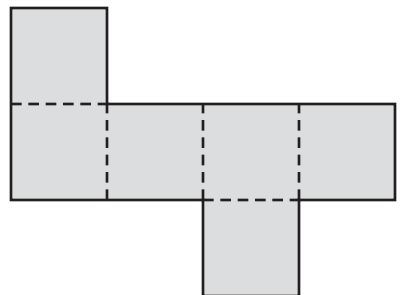
23.



24.



25.

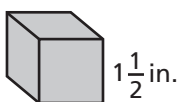
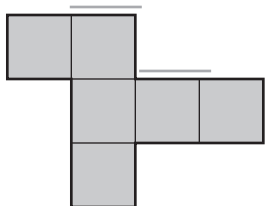




► Fractional Edge Lengths

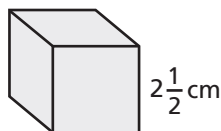
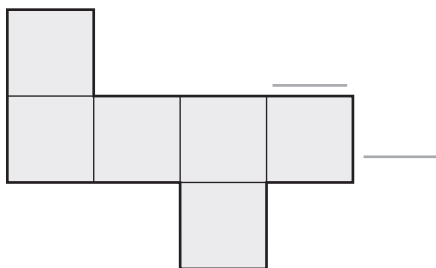
The net on the left forms the rectangular prism on the right. Fill in the missing dimensions. Then find the area of a face and the surface area of each cube.

26.



Area of a face: _____ Surface area: _____

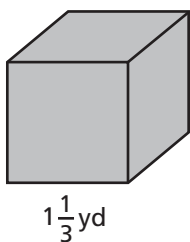
27.



Area of a face: _____ Surface area: _____

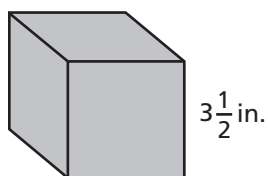
Find the surface area. Draw a net if you need to.

28.

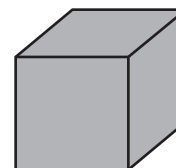


Surface area: _____ Surface area: _____

29.



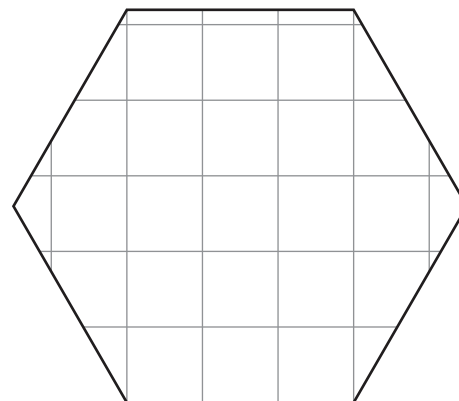
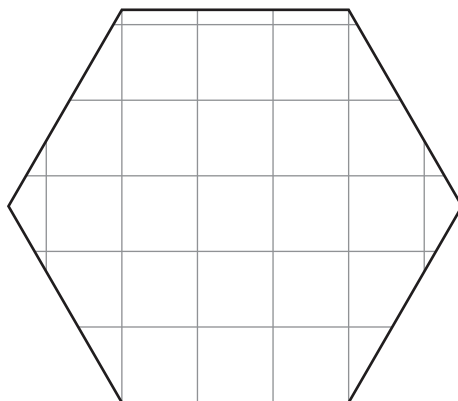
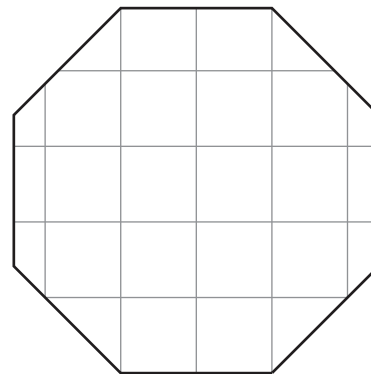
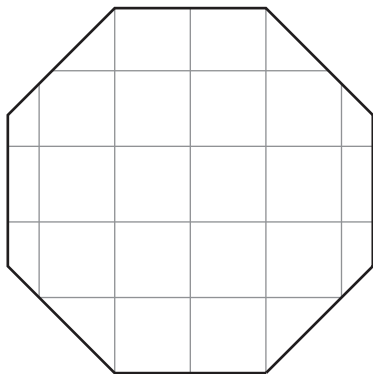
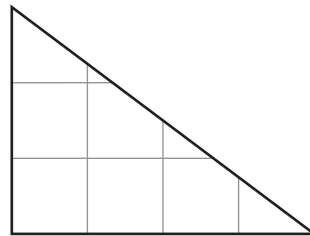
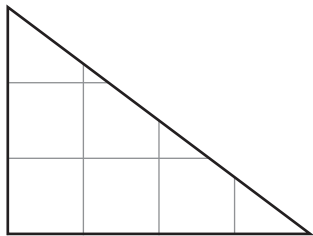
30. How can you find the surface area of any cube?



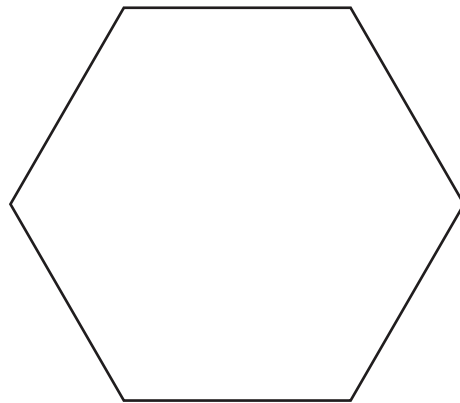
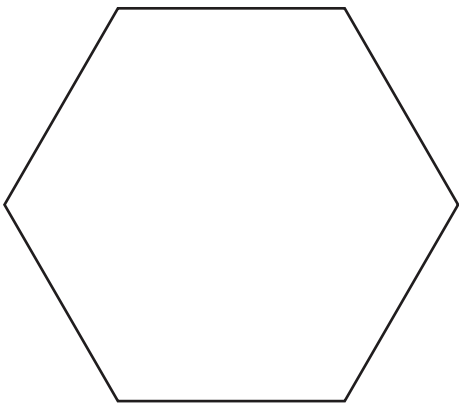
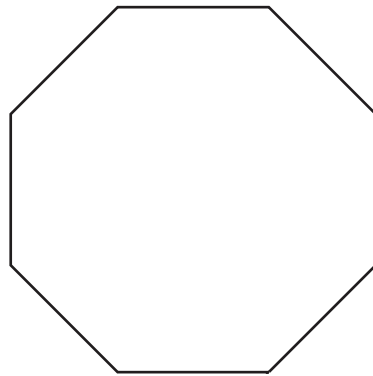
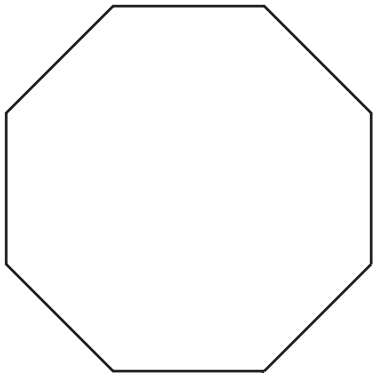
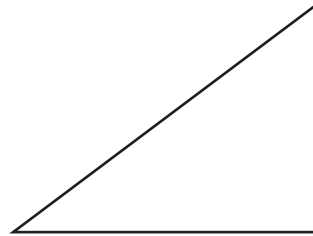
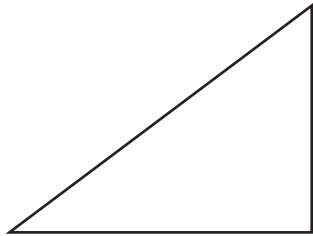
31. Use the cube at the right to write an expression to show how you can find the surface area of any cube.

► Make Nonrectangular Prisms

Cut out the polygons from this page and the rectangles from the next page to make nonrectangular prisms.

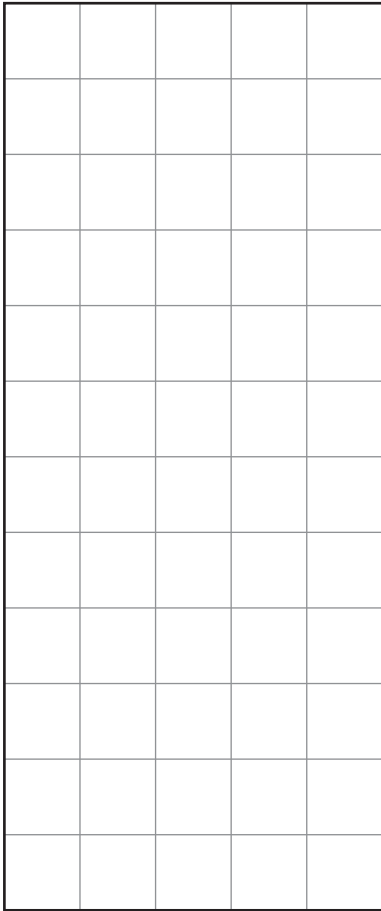


► Make Nonrectangular Prisms (continued)

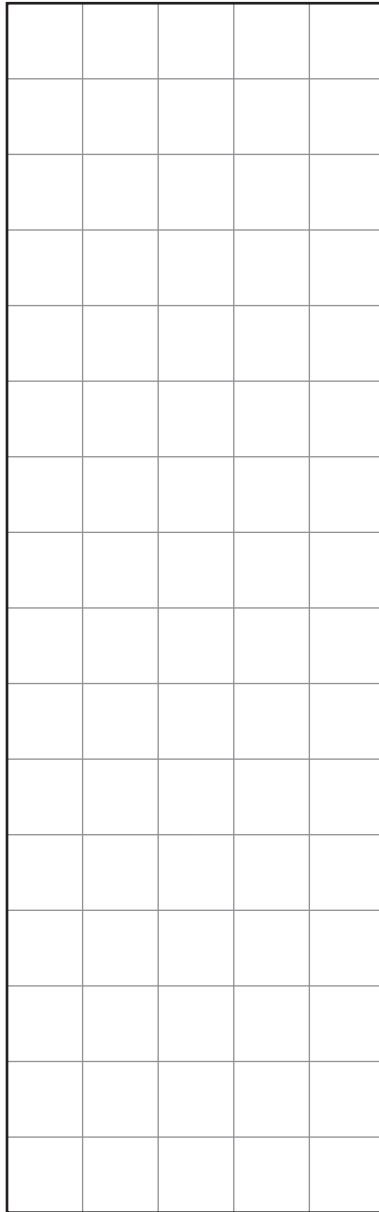


► Make Nonrectangular Prisms (continued)

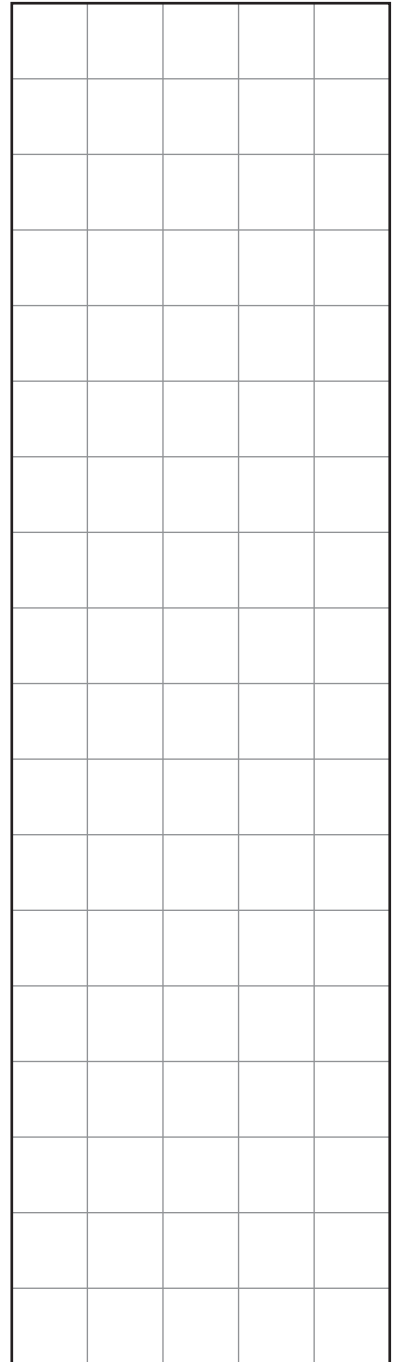
For triangular prism



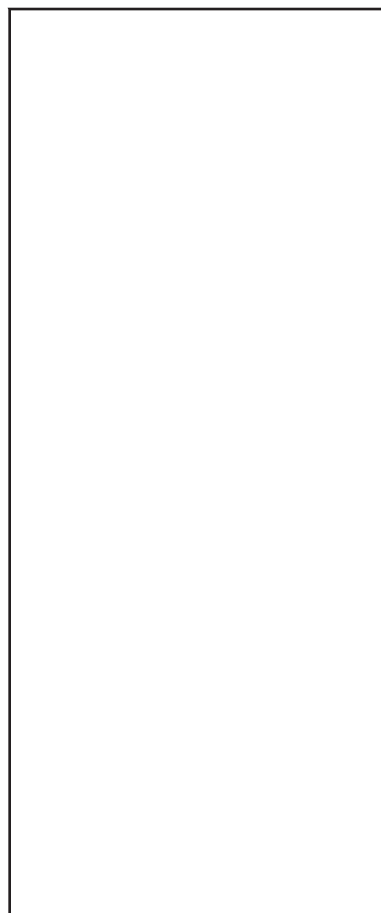
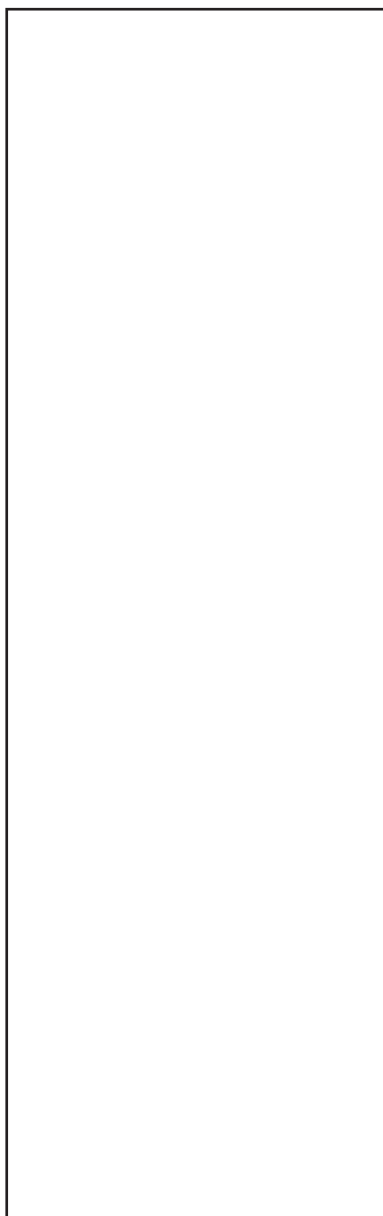
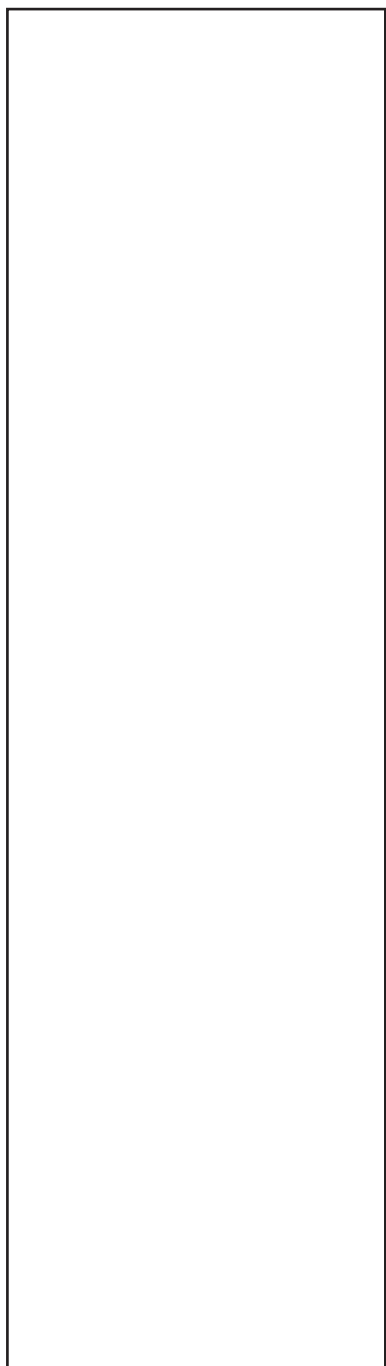
For octagonal prism



For hexagonal prism

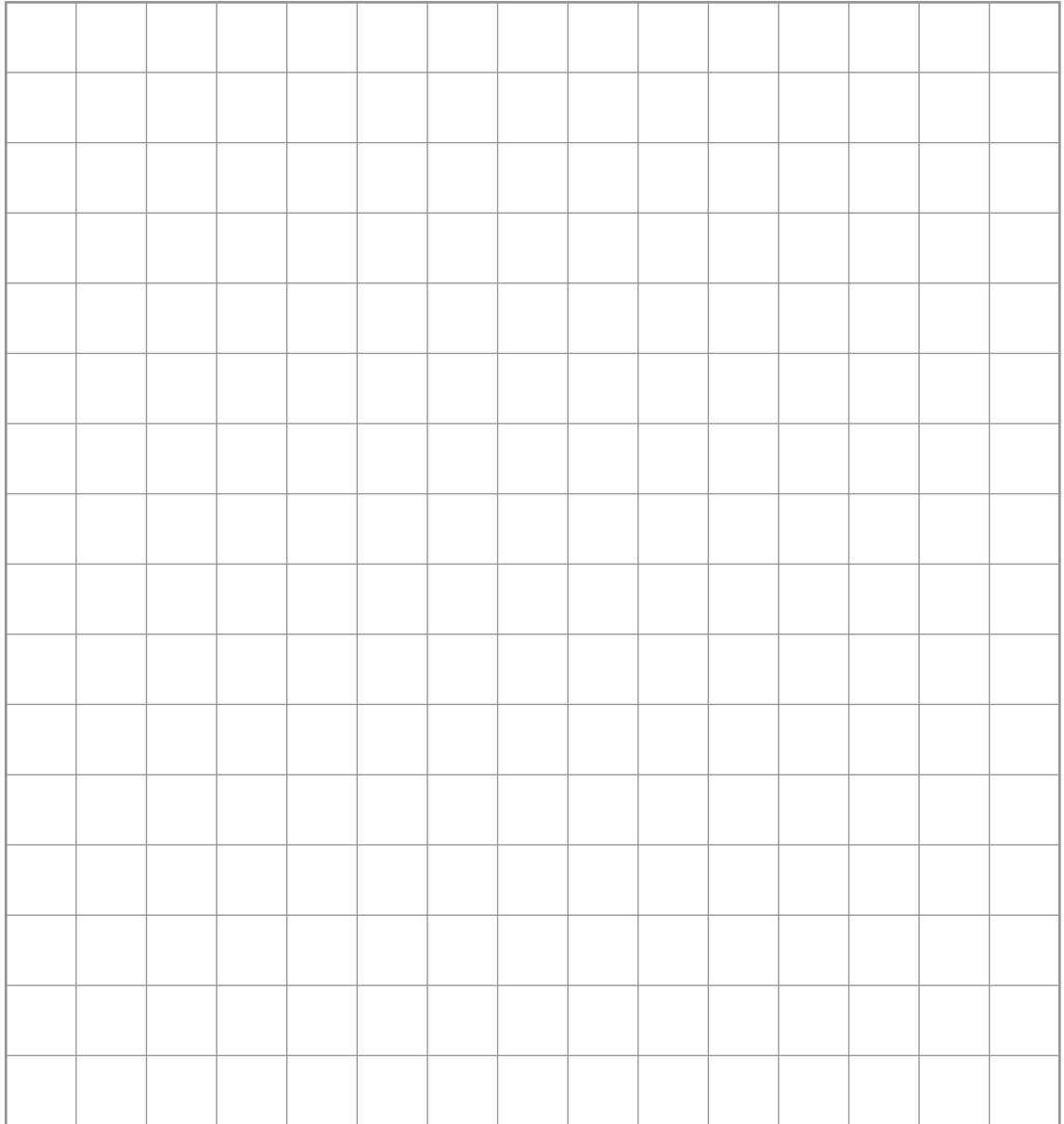


► Make Nonrectangular Prisms (continued)

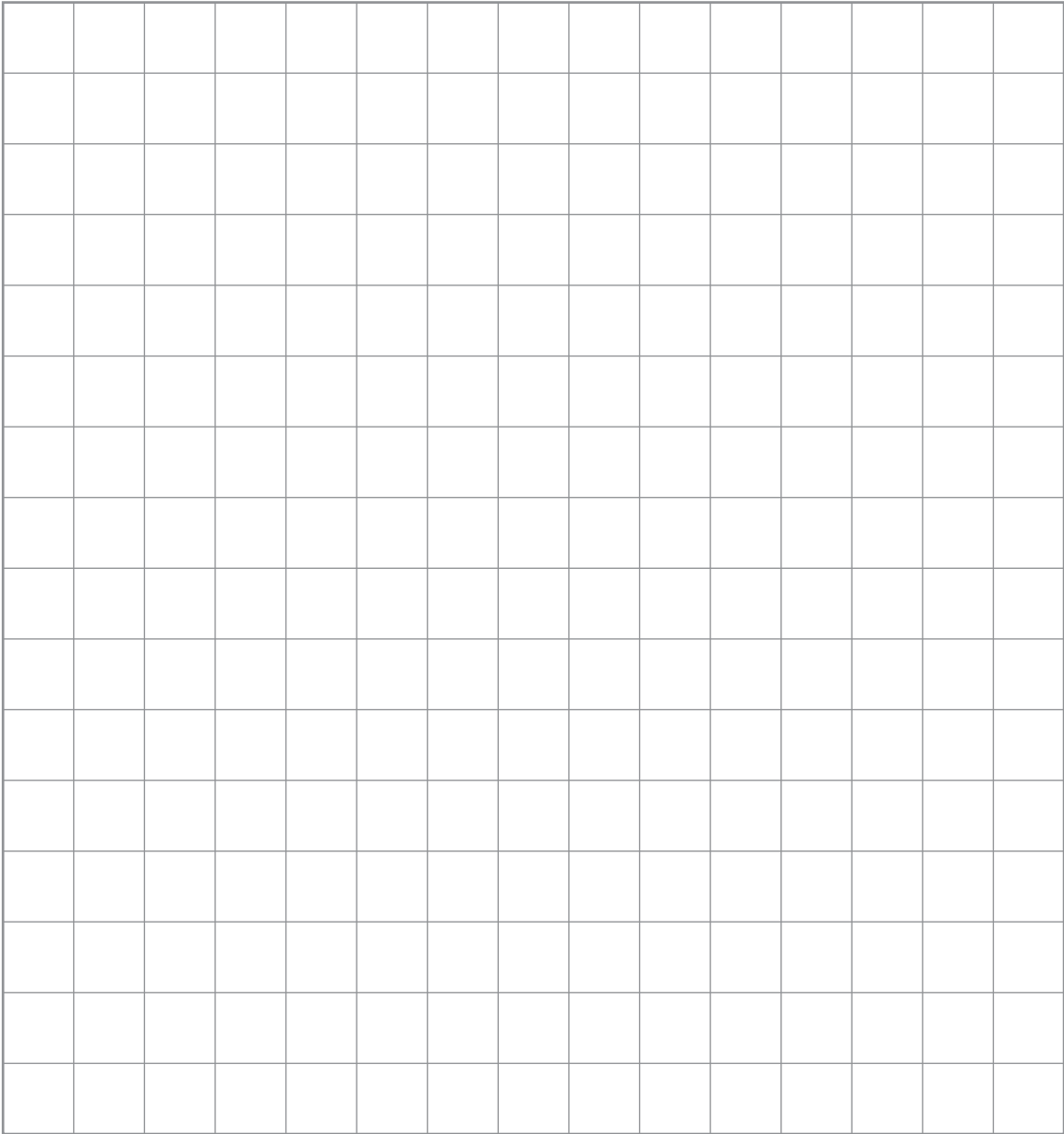


► Draw a Net for a Nonrectangular Prism

Draw a net for a nonrectangular prism. Then cut out the net and form a nonrectangular prism.



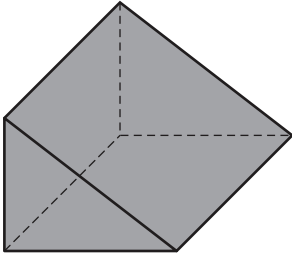
► Draw a Net for a Nonrectangular Prism (continued)



► Identify Prisms

Write the shape of the base and use it to name the prism.

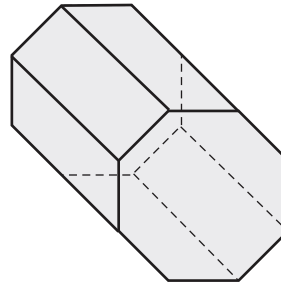
1.



Base: _____

Name: _____

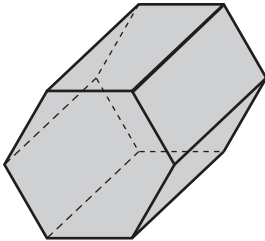
2.



Base: _____

Name: _____

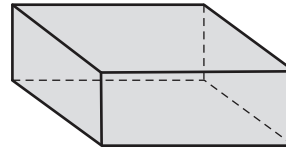
3.



Base: _____

Name: _____

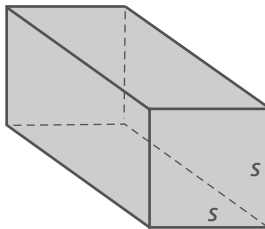
4.



Base: _____

Name: _____

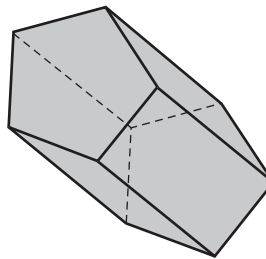
5.



Base: _____

Name: _____

6.



Base: _____

Name: _____

7. What do you notice about the name of the base and the name of the prism?

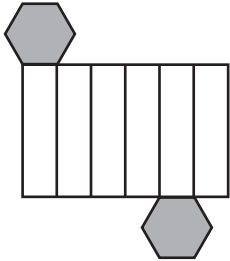
8. How is a prism named? _____



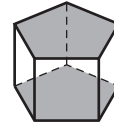
► Match Nets and Solids

Match each net in the first column to a solid in the second column.

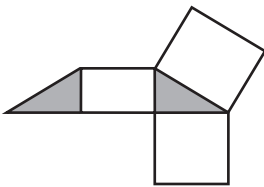
9. _____



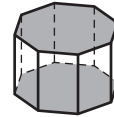
A.



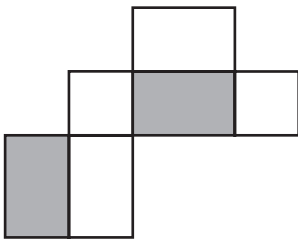
10. _____



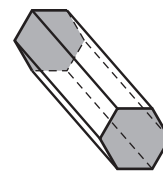
B.



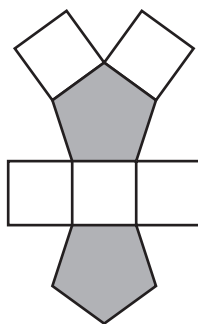
11. _____



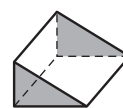
C.



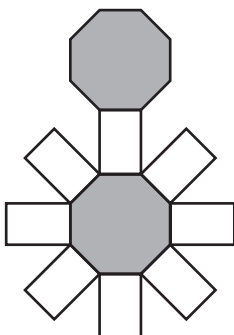
12. _____



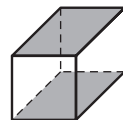
D.



13. _____



E.



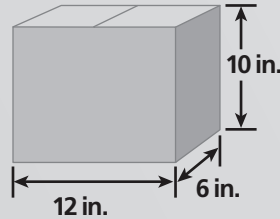
► What's the Error?

Dear Math Students,

I designed some shipping boxes with no overlapping cardboard. I found that it takes 444 in.^2 to make this box. Is my answer correct? If not, can you tell me what I did wrong?

Your friend,

Puzzled Penguin



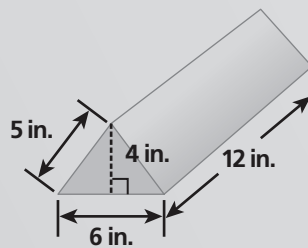
1. Write a response to the Puzzled Penguin.

Dear Math Students,

Here is another shipping box I invented with no overlapping cardboard. I found that it takes 240 in.^2 to make this box. Is my answer correct? If not, can you tell me what I did wrong?

Your friend,

Puzzled Penguin

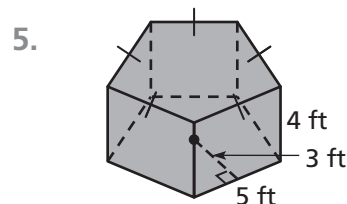
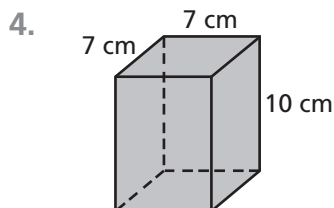
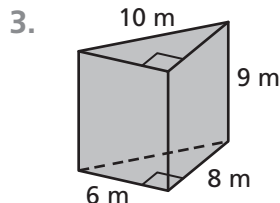


2. Write a response to the Puzzled Penguin.



► Find the Surface Area

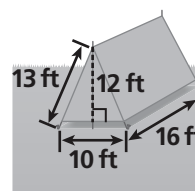
Find the surface area.



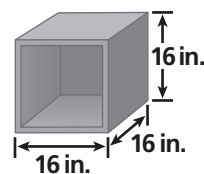
► Solve Real World Problems

Solve.

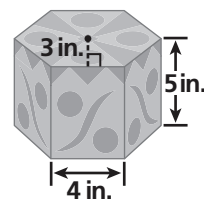
6. Harry and Jaime pitched this canvas tent on a camping trip. The tent has five surfaces. How many square feet of canvas did it take to make the tent?
-



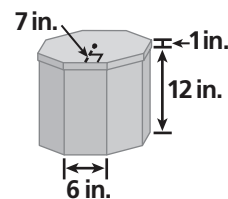
7. Rita bought this storage cube for her room. How many square inches of wood did it take to make the storage cube?
-



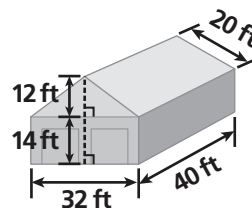
8. Erin made this jewelry box with a regular hexagon for the top and bottom. How many square inches of cardboard did she use?
-



9. Kent bought a hat that came in this box. How many square inches of cardboard did it take to make this hatbox and top?
-

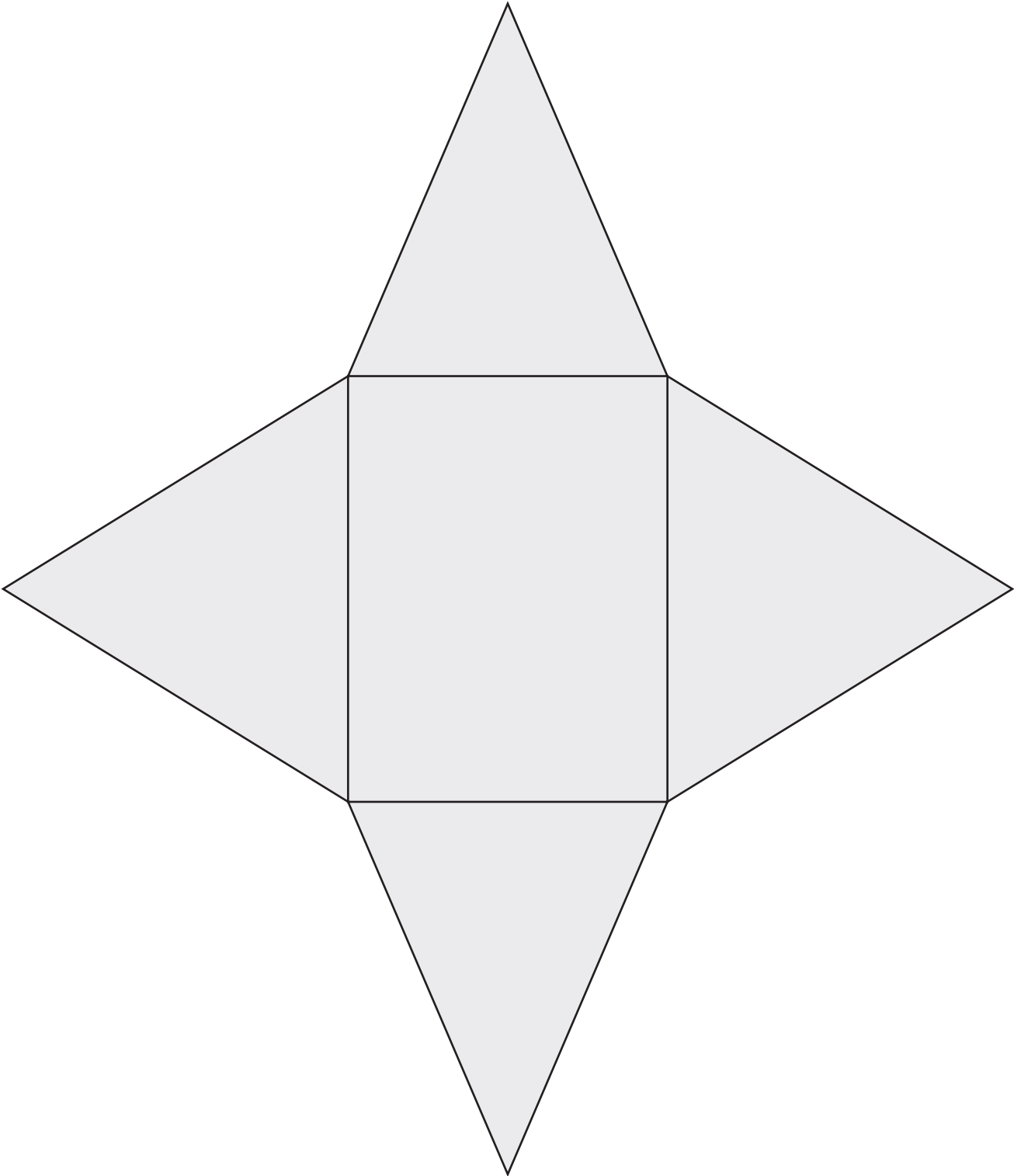


10. A contractor needs to know how many square feet of metal it takes to build this warehouse including the roof. The warehouse will have a concrete floor. How many square feet of metal does he need?
-

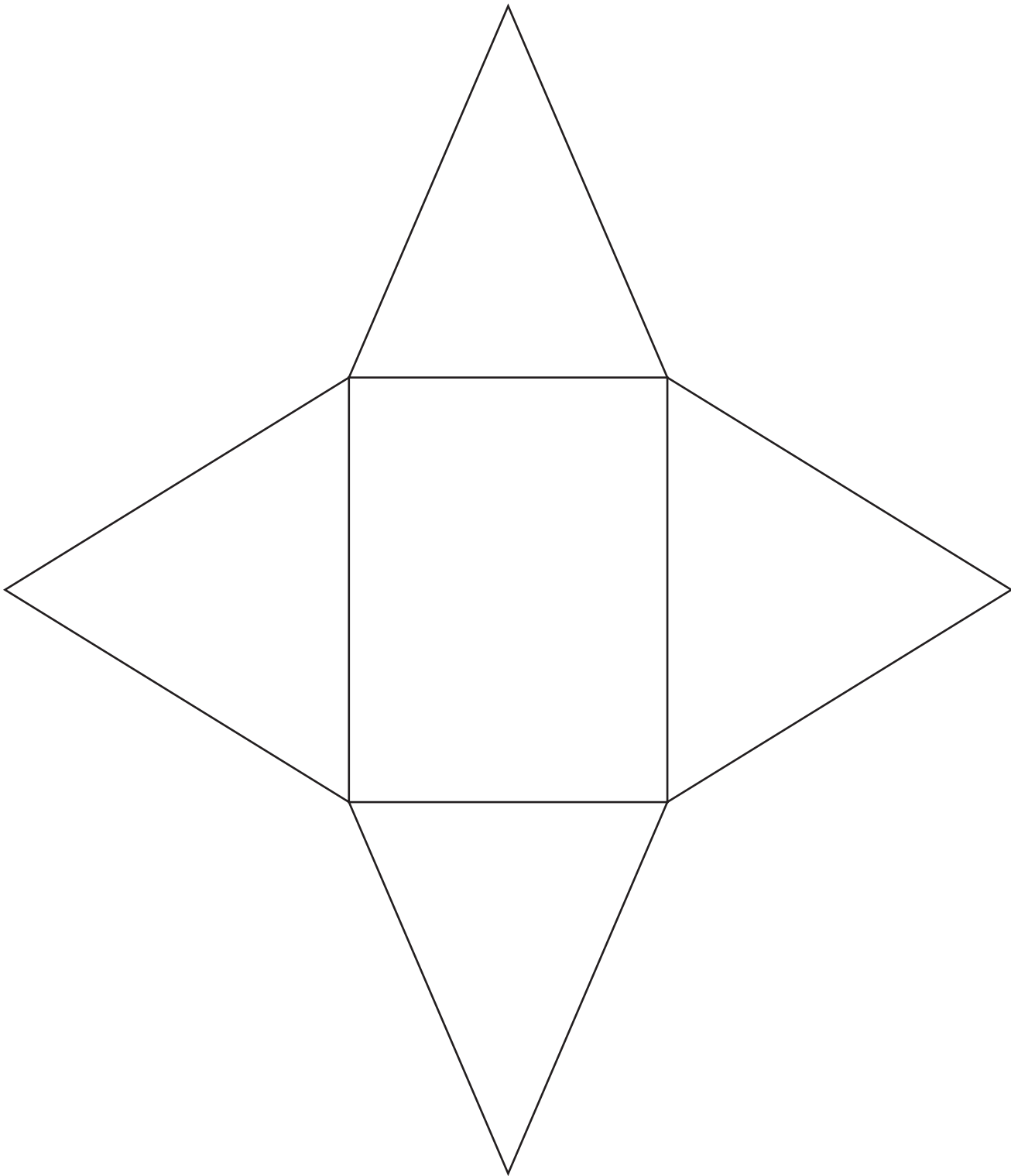


► Make a Pyramid

Cut out the net and form the solid figure.

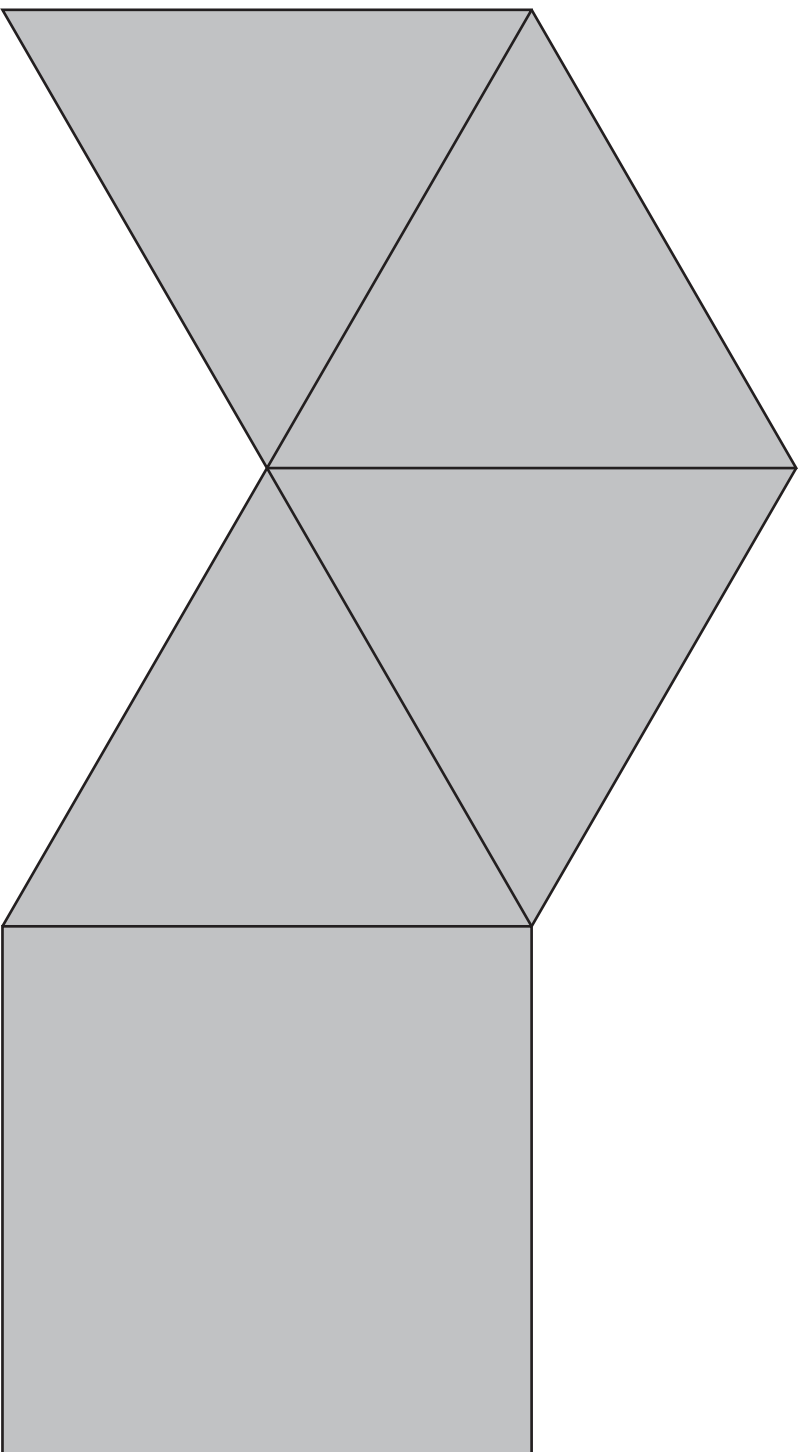


► Make a Pyramid (continued)

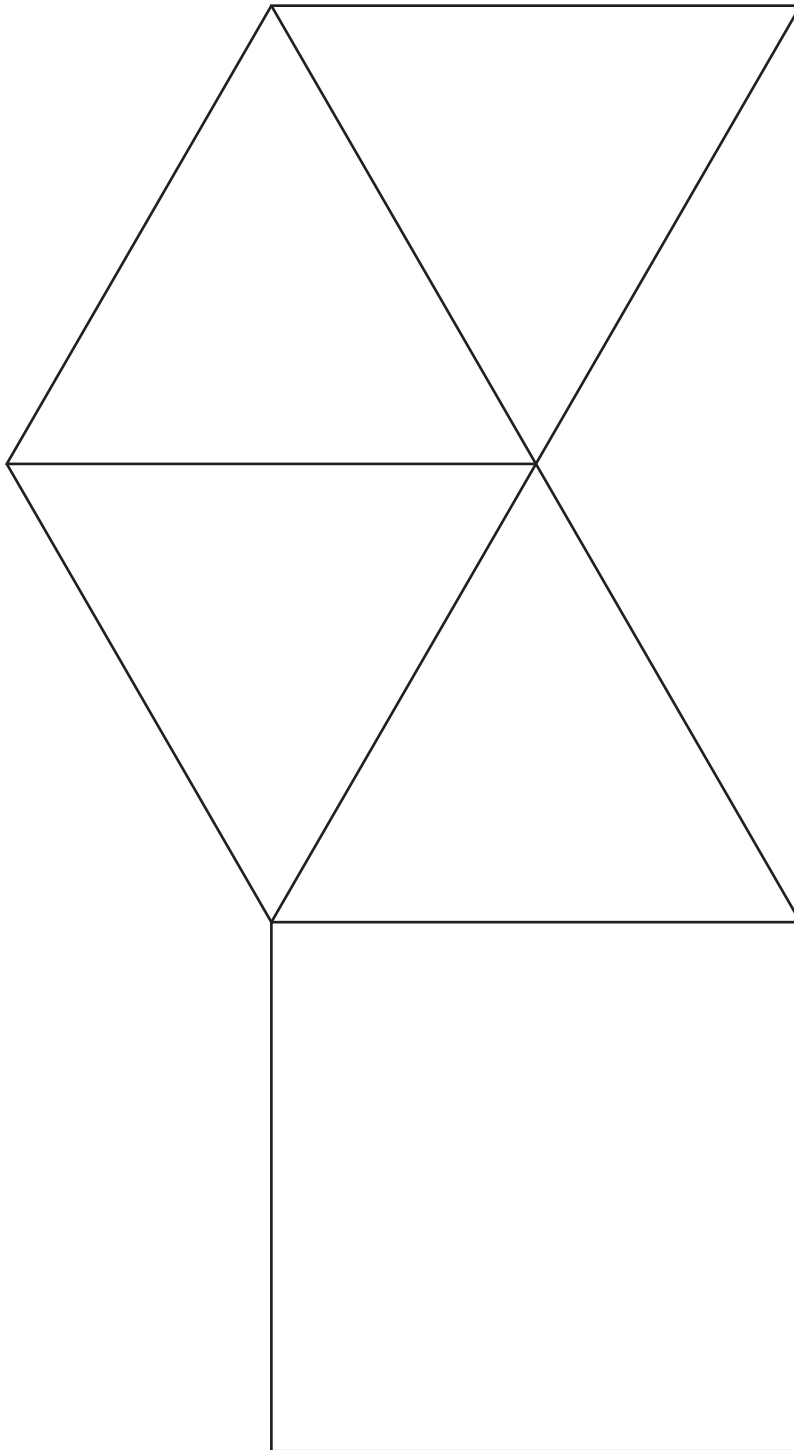


► Make Another Pyramid

Cut out the net and form the solid figure.



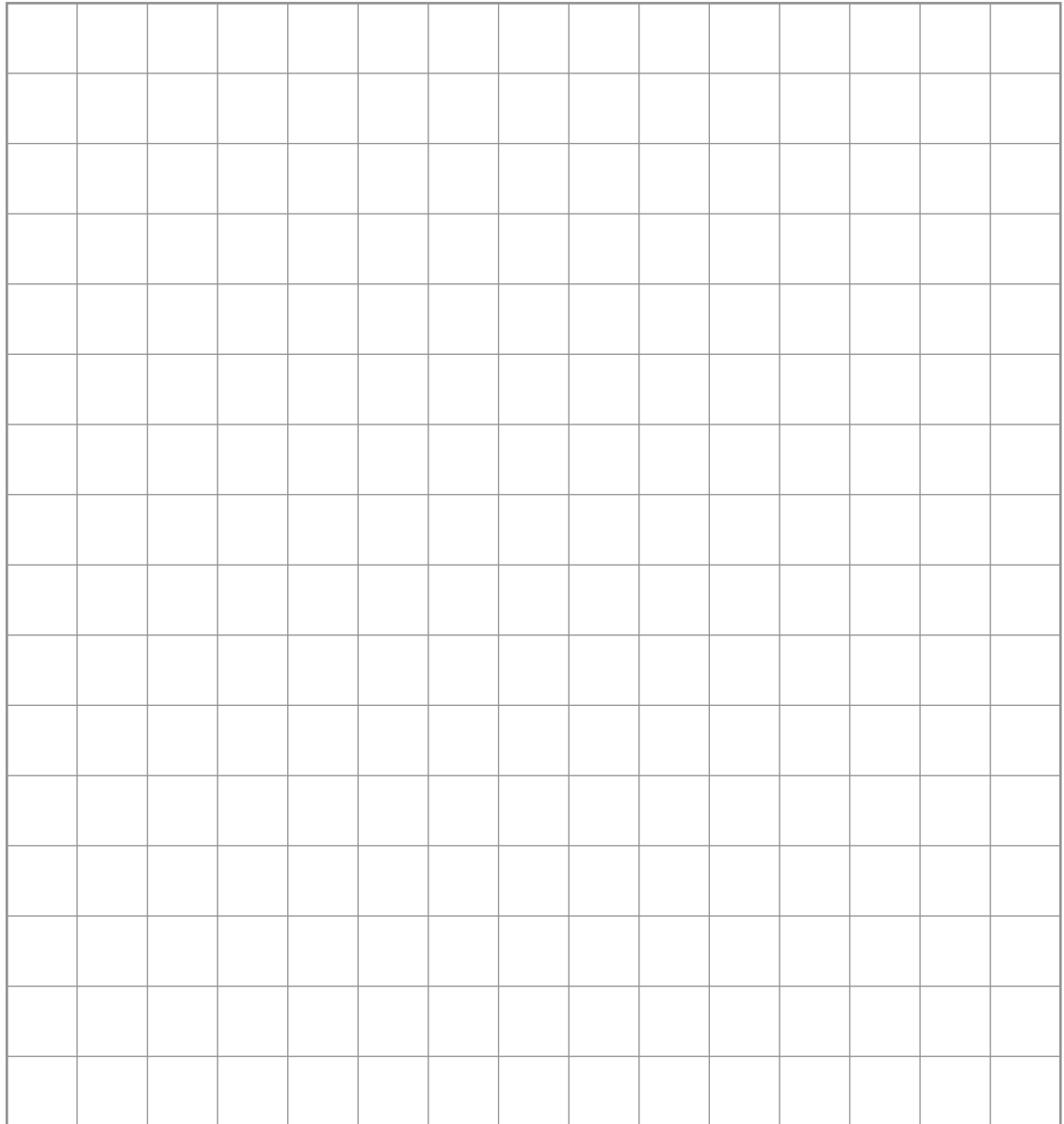
► Make Another Pyramid (continued)



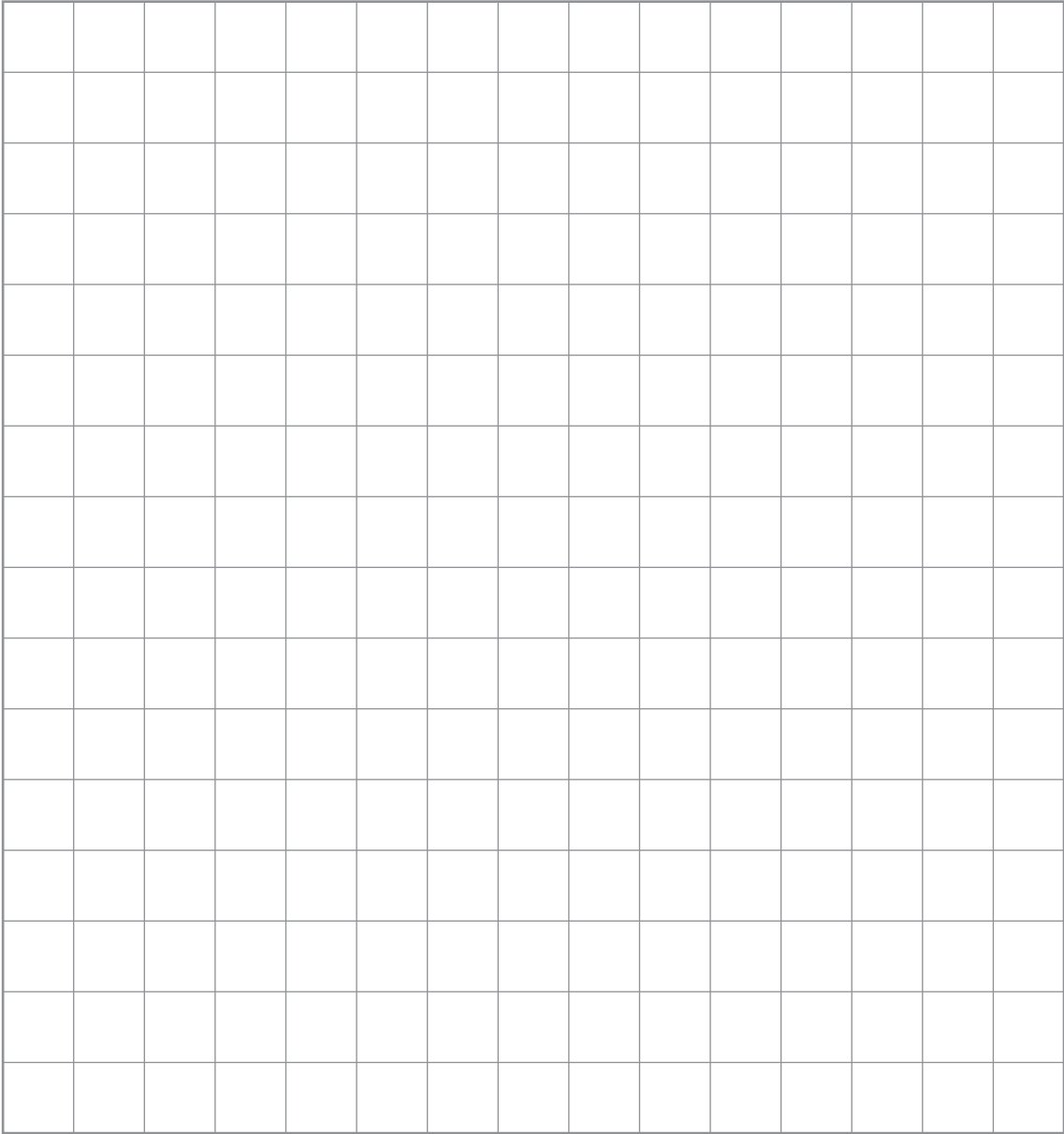


► Draw a Net for a Pyramid

Draw a net for a pyramid. Then cut out the net and form the pyramid.

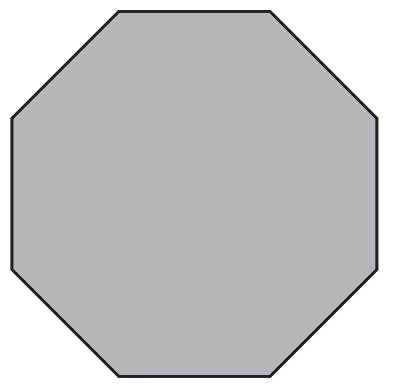
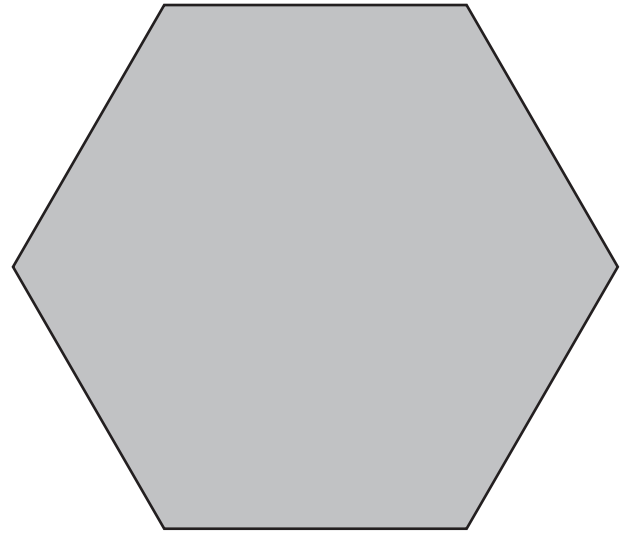
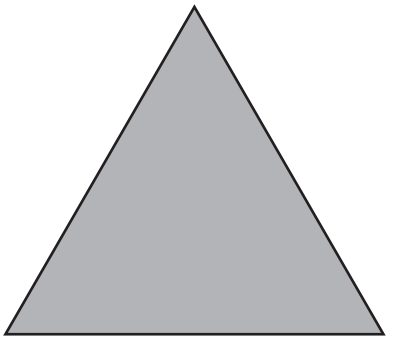
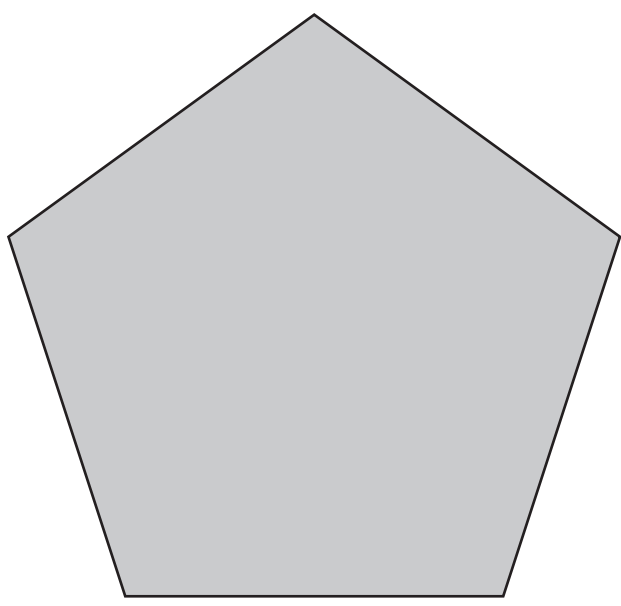


► Draw a Net for a Pyramid (continued)

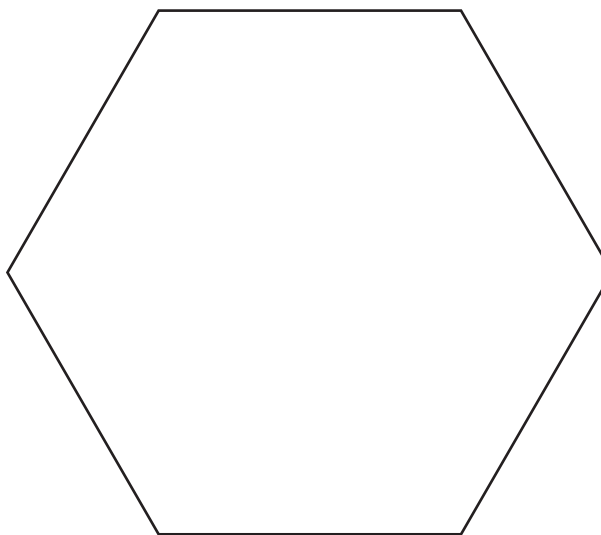
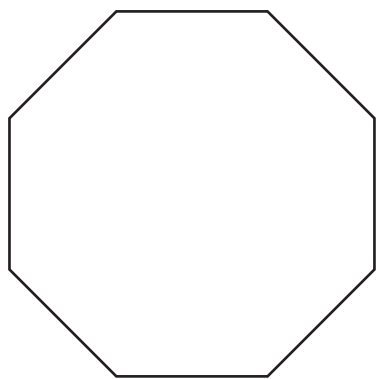
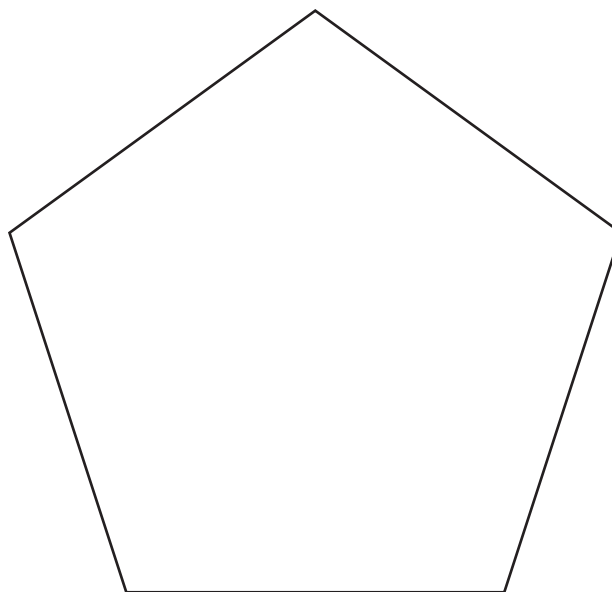
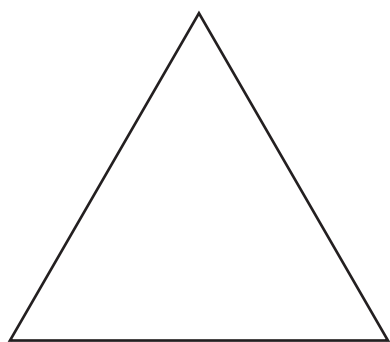


► Make Pyramids with Other Bases

Cut out the polygons from this page and the triangles from the next page to form pyramids.

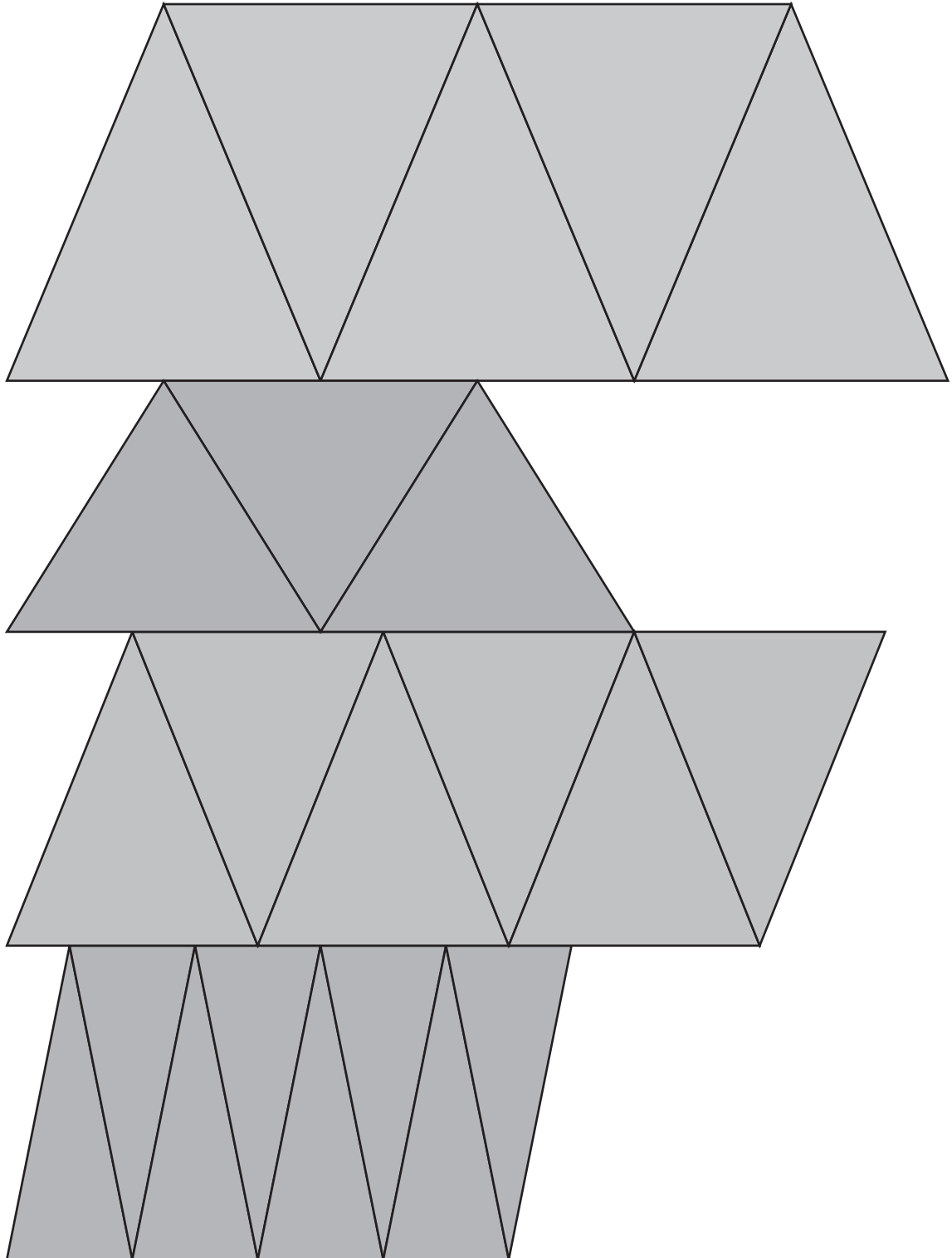


► Make Pyramids with Other Bases (continued)

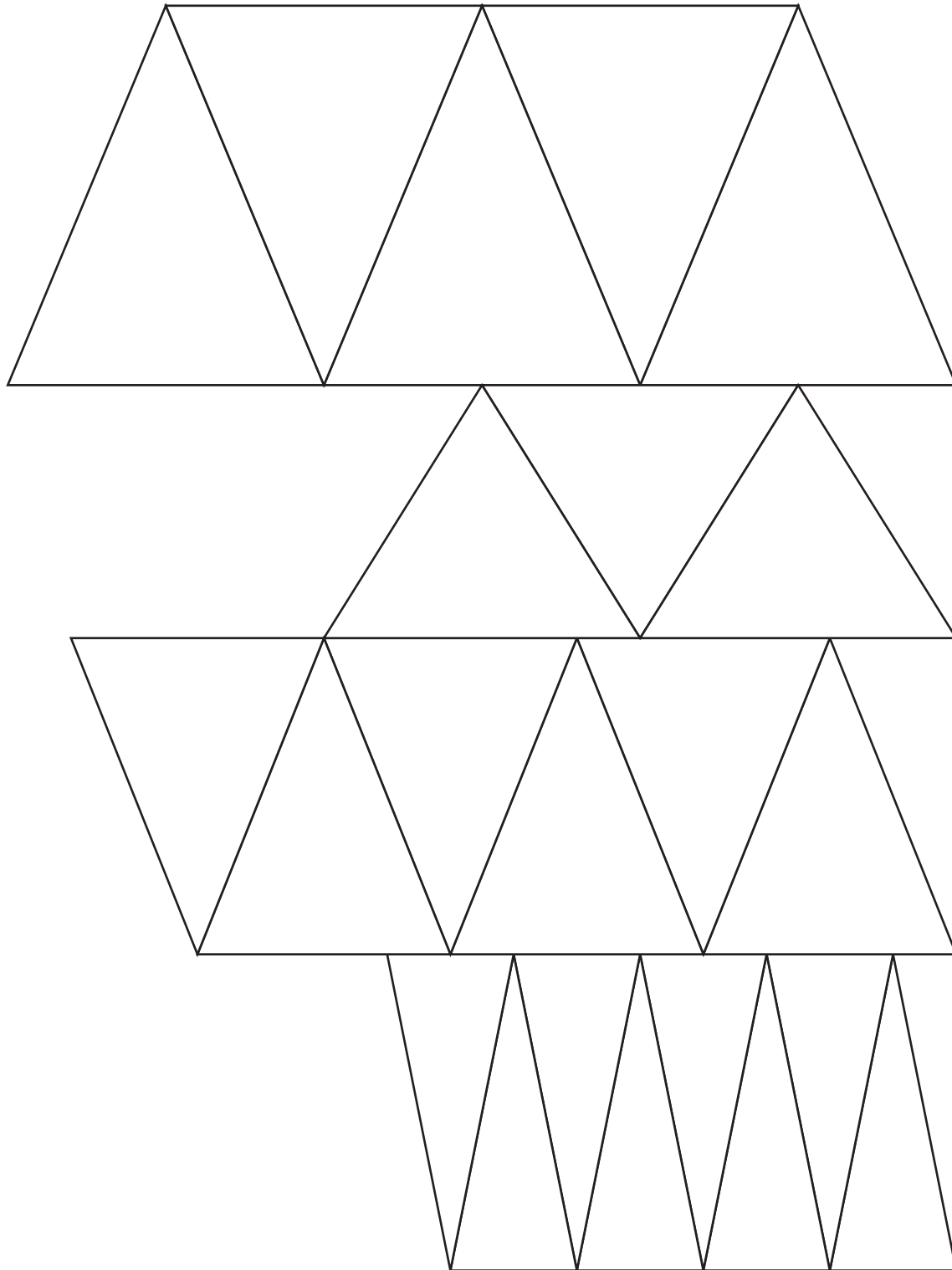




► Make Pyramids with Other Bases (continued)



► Make Pyramids with Other Bases (continued)





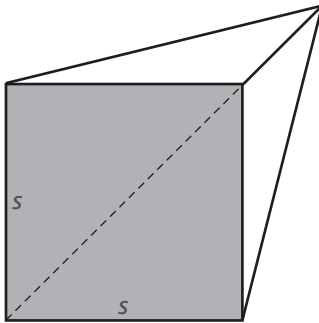
pyramid
 base
 face

► Discuss Pyramids

A **pyramid** is a solid whose **base** can be any polygon and whose other **faces** are triangles that meet at a point.

Name the shape of the base and use it to name the pyramid.

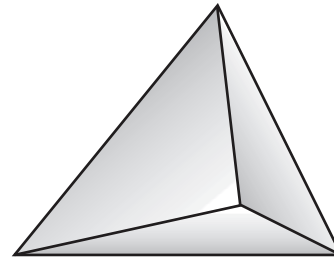
1.



Base: _____

Name: _____

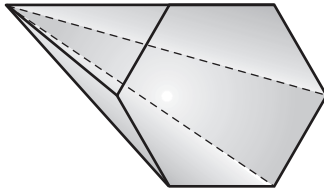
2.



Base: _____

Name: _____

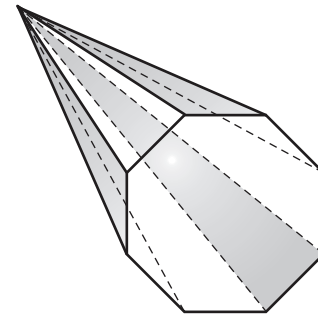
3.



Base: _____

Name: _____

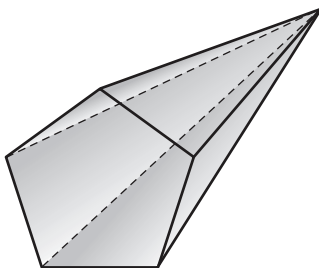
4.



Base: _____

Name: _____

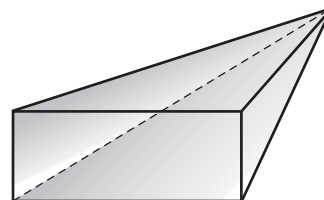
5.



Base: _____

Name: _____

6.



Base: _____

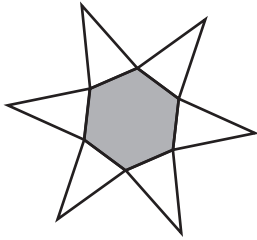
Name: _____



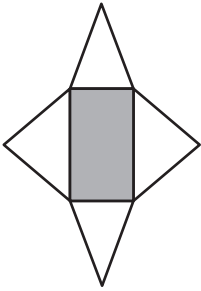
► Pyramids and Nets

Match each net to a solid.

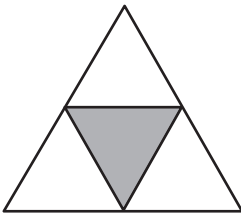
7. _____



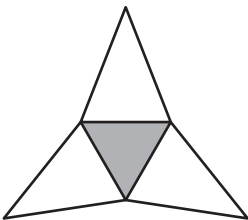
8. _____



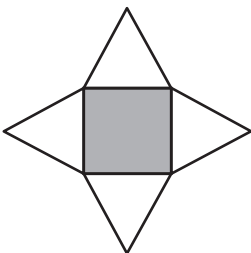
9. _____



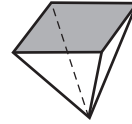
10. _____



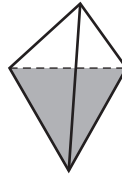
11. _____



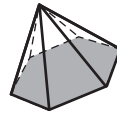
A.



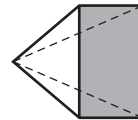
B.



C.



D.



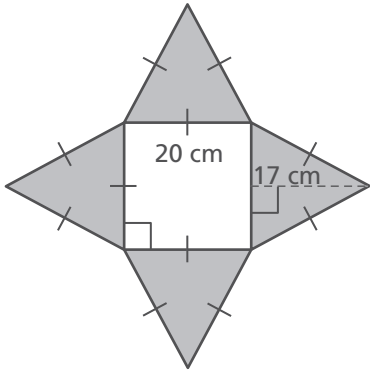
E.



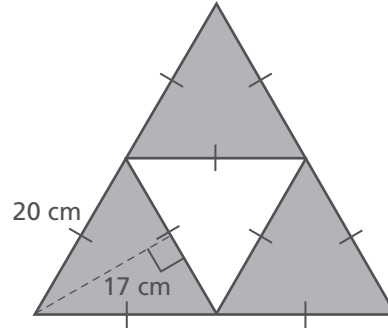
► Find Surface Area

These nets form pyramids. Find the surface area of each net.

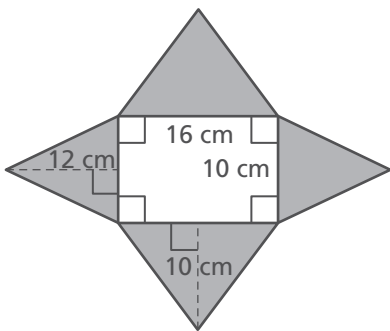
1.



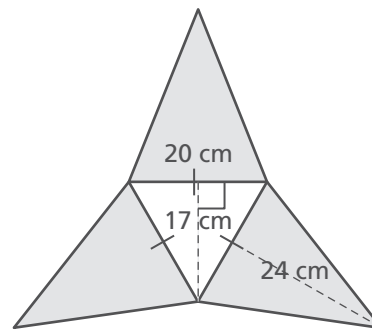
2.



3.

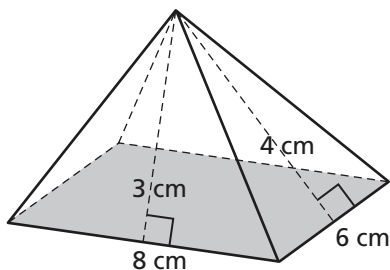


4.

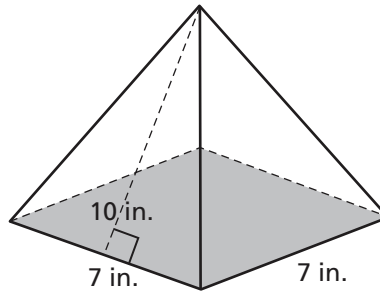


Find the surface area of each pyramid.

5.



6.

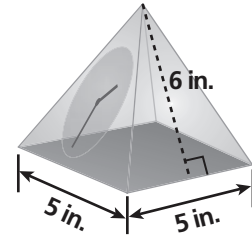




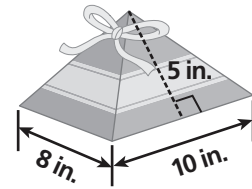
► Solve Real World Problems

Solve.

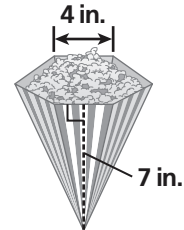
7. Marjorie bought this clock. How many square inches of glass did it take to make the clock?



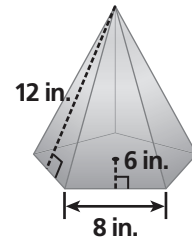
8. Lee bought a gift that came with this box. He wants to glue wrapping paper without any overlap to the 4 faces and base. How many square inches of wrapping paper will he need?



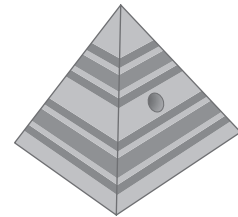
9. Nina is making containers to hold popcorn for a party. How many square inches of cardboard will it take to make 8 of these containers?



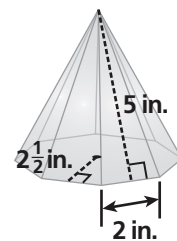
10. Tim made this paperweight in a crafts workshop. He glued metal to each face of the paperweight. How many square inches of metal did he use?



11. This bead is in the shape of a triangular pyramid. Each face of this bead has a surface area of about $\frac{1}{2}$ in.² How many square inches would it take to make a tight fitting cover for the bead ignoring any overlap?



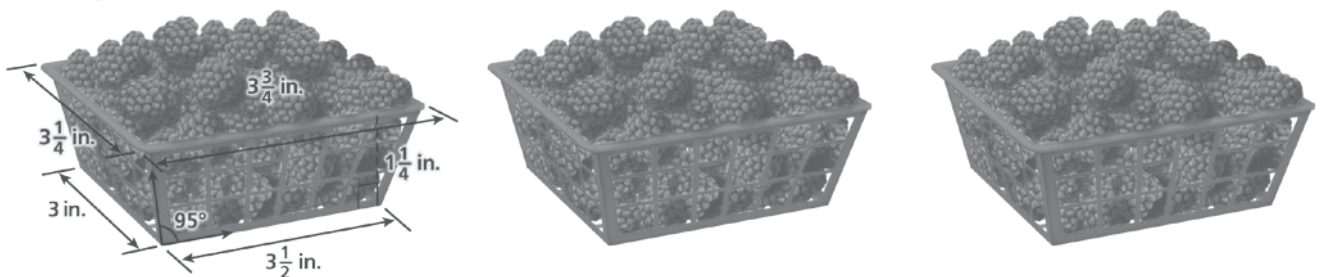
12. This ice sculpture will be on a banquet buffet table. How many square inches will it take to wrap the faces of the ice sculpture in paper with no overlaps?



► Math and Packaging



Tiffany and her family grow berries and vegetables and sell them at a Farmers' Market. These are the berry baskets they use to package their berries.



1. Make a net for a berry basket with same dimensions as the one shown above on Quarter-Inch Grid Paper (TRB M19), cut it out, and use tape to form the berry basket.



► Make a Carry Container

Tiffany wants to make a carry container to hold three berry baskets so customers can carry them home without spilling or damaging the berries.



2. Tape two Quarter-Inch Grids (TRB M19) together so there are no gaps between grids. Draw a net for a carry container that will hold three berry baskets and take up the least surface area.

3. Use the net to find the surface area of the carry container.

4. Cut out the net and form the carry container. Use the berry baskets you made to test that they fit in the carry container.

5. Tiffany's brother Aaron made a container fold down to make it easier to stack and carry them. He made a fold on each end of the front and back as shown below. Is this the best angle for folding? Use your carry container to try some different angles for folding and decide which one works best.





1. Identify the units in which surface area can be measured.
Select all that apply.

- (A) inches
- (B) square feet
- (C) square inches
- (D) feet
- (E) square yards
- (F) yards

2. Are the lateral faces of a right rectangular prism always rectangles? Explain.

3. For 3a–3d, choose Yes or No to indicate if the solid figure has triangular lateral faces.

- 3a. Rectangular prism Yes No
- 3b. Rectangular pyramid Yes No
- 3c. Triangular prism Yes No
- 3d. Triangular pyramid Yes No

4. How do you know the number of rectangular faces a nonrectangular prism will have? Explain.



5. The minimum number of different surface areas you need to find to calculate the surface area of a rectangular prism that is not a cube or square prism is—

- (A) 3
 (B) 4
 (C) 5
 (D) 6

6. The net below is a net of a rectangular prism. The bases are marked B.

Part A

Mark the pairs of congruent lateral faces using the labels L1 and L2.

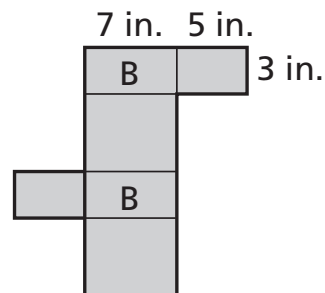
Part B

Describe how can you use B, L1, and L2 to calculate the total surface area of the prism with a *minimum* number of computations.

Part C

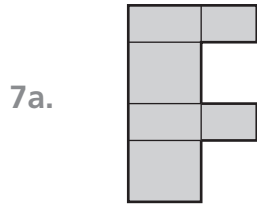
Use the method you described above to find the surface area (SA) of the prism. Label your answer.

SA = _____

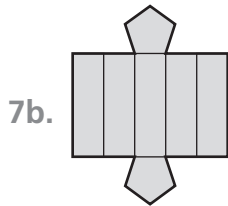




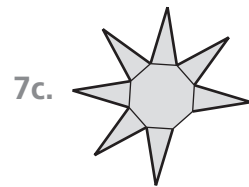
For numbers 7a–7c, choose Yes or No to indicate if the net will form a solid figure.



Yes No



Yes No



Yes No

7d. If you answered No for any net above, correct the net so it forms a solid figure.

7e. Choose the word that makes the sentence true.

Figure 7a will form a
 pentagonal prism
 square prism
 rectangular prism

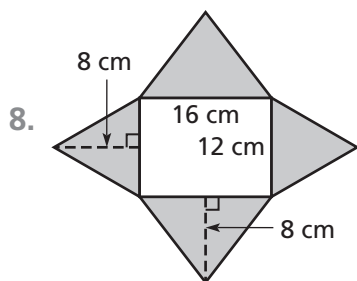
Figure 7b will form a
 pentagonal prism
 octagonal prism

Figure 7c will form a
 pentagonal prism
 square prism
 octagonal pyramid

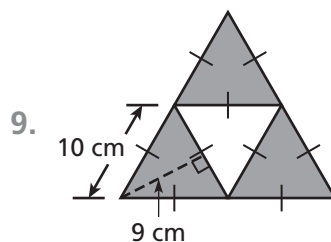


For numbers 8 and 9, use the net to find the total surface area of the solid figure it represents. Show your work.

(Some of the given measurements are rounded to simplify the computation.)



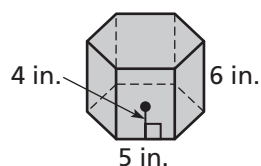
_____ cm²



_____ cm²

10. Are the lateral faces of a pyramid always triangles?
Explain your answer.

11. Janice calculated the surface area of this prism as 200 in.². Review her method and decide if her calculation is correct. Explain your answer.



Lateral area: $6(5 \cdot 4) = 6 \cdot 20 = 120$

Base area: $\frac{1}{2}(5 \cdot 4) = \frac{1}{2}(20) = 10$

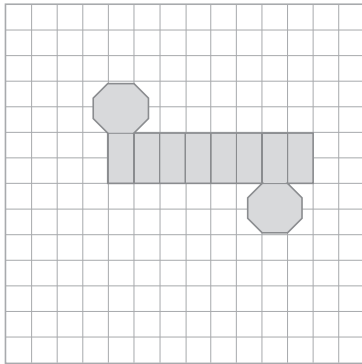
S.A. = $120 + 2(10) = 140$ in.²



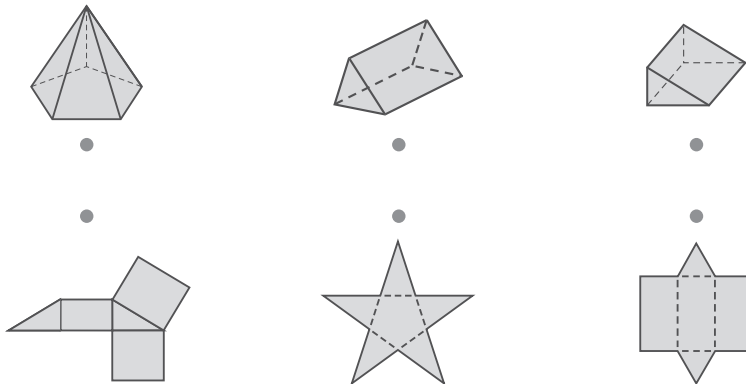
A prism has 8 rectangular sides.

12a. The name of this solid figure is a(n) _____ prism.

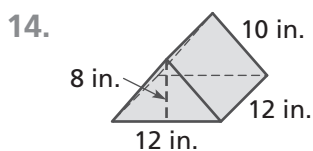
12b. On the grid below, sketch a net that could be a net of the prism. Think: Is it best to draw the lateral sides or the bases first?



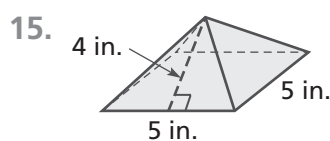
13. Draw a line to match each solid figure with its net.



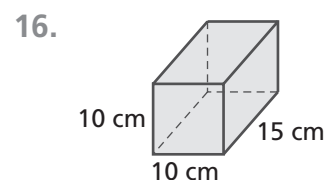
For numbers 14–16, use the numbers from the number tiles to represent the surface area of each figure. You may use each number more than once.



in.²



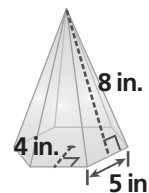
in.²



cm²

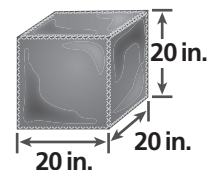


17. In a math class, students are making hexagonal pyramids out of cardboard. How much cardboard did it take to make this hexagonal pyramid? Show your work.



_____ in.²

18. Ray covered a box with purple paper. The figure shows the dimensions of the box.



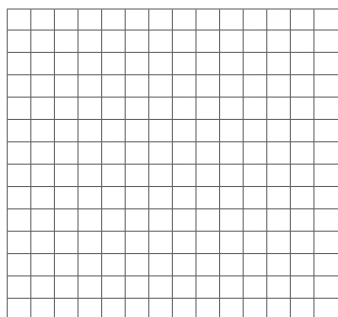
Use the numbers and symbols below to write an equation that shows how much paper he used. Ignore any overlap. You will not need all of the numbers and symbols.

20	20	4	6	×	÷	×	=	2,600	2,400
----	----	---	---	---	---	---	---	-------	-------

_____ in.²

19. An unopened box of raisins in the shape of a rectangular prism has a top that measures 4 inches by $1\frac{3}{4}$ inches. The back of the box measures 6 inches by 4 inches.

Part A: Draw a picture of the box and label the sides with the measurements provided.



Part B: Calculate the surface area of the box. Show your work in the space below.

_____ in.²