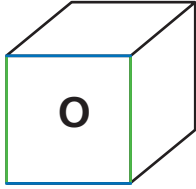Name _____   Date _____

Making a Figure Zoo

NCTM Standards 3, 6, 7, 8, 9

Use the picture or the actual polyhedron to answer these questions.
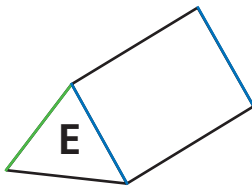
O

The polyhedron has six square faces.

1 Look at face O.

The two blue edges are: parallel   or   perpendicular

The blue edges are: parallel or perpendicular to the green edges.

An angle formed by a blue and green edge is: acute or right or obtuse

E

This polyhedron has five faces.

Three of them are rectangles

2 What shape is face E on the figure?

_____

3 The angle formed by a blue and green edge of face E is:

acute   or   right   or   obtuse

Use your previous experience with figures or refer to a polyhedron in the figure zoo to help you answer these questions. Think about the sides and angles of each figure while you answer.

4 Describe the features that make a figure a square.

_____

_____

_____

_____

_____

_____

5 Describe the features that make a figure a triangle.

_____

_____

_____

_____

_____

_____

6 **Challenge** Describe the features that make a figure a trapezoid.

_____

_____

_____

_____

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Name _____   Date _____

Describing Three-Dimensional Figures

NCTM Standards 3, 6, 7, 8, 9, 10

Attach a copy of your net here.

---

1 Describe the faces of your figure.

_____

_____

_____

**2** Does your solid have two faces that don't share an edge?

☐ Yes   ☐ No

If you answered yes, shade one pair of those faces on the net.

**3** Does your solid have two faces that appear to be perpendicular to each other?

☐ Yes   ☐ No

If you answered yes, circle them on the net.

4 The quadrilateral on this net is a square. Find two parallel edges on the three-dimensional figure. Circle them on the net.

F

F
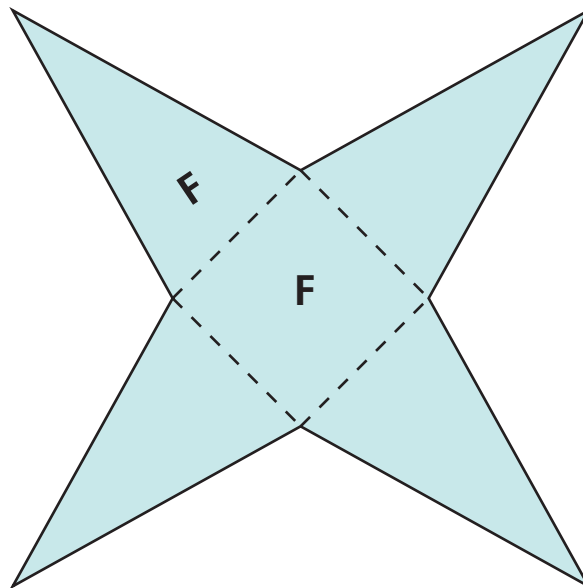
5 All of the figures on this net are rectangles. Find two perpendicular faces on the three-dimensional figure. Shade them on the net.

G

G
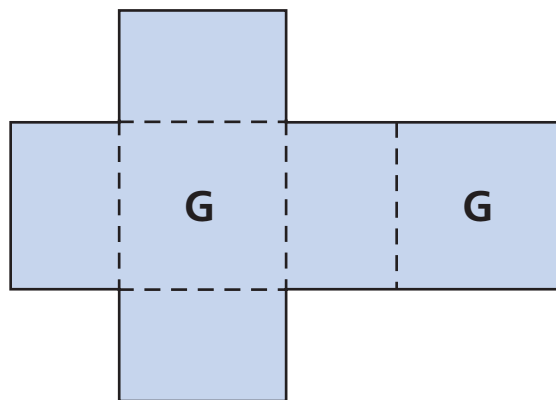
**6 Challenge** Find two vertices that are not connected by an edge. Circle them on the net.

E

Name _____   Date _____
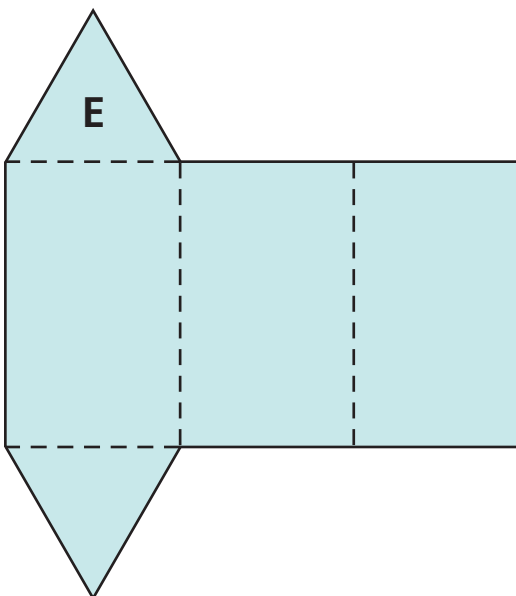
Going On a Figure Safari

NCTM Standards 3, 6, 7, 8, 9, 10

For each puzzle, look through all the polyhedra and list the letters of those that appear to match the clues. Try standing each figure on different faces to see if there is any way the figure might fit the clues.

Clues	Answers
1 ☑ All of my faces are rectangles. ☑ At least 2 of my faces are squares.	
2 ☑ I have at least 2 faces that are parallel to each other.	
3 ☑ All of my angles are right. ☑ All of my faces are congruent.	
4 ☑ I have the same number of faces as vertices. ☑ At least 3 of my faces are congruent.	
5 ☑ I have more vertices than faces. ☑ At least one of my faces is not a rectangle. ☑ None of my faces is perpendicular to another face.	
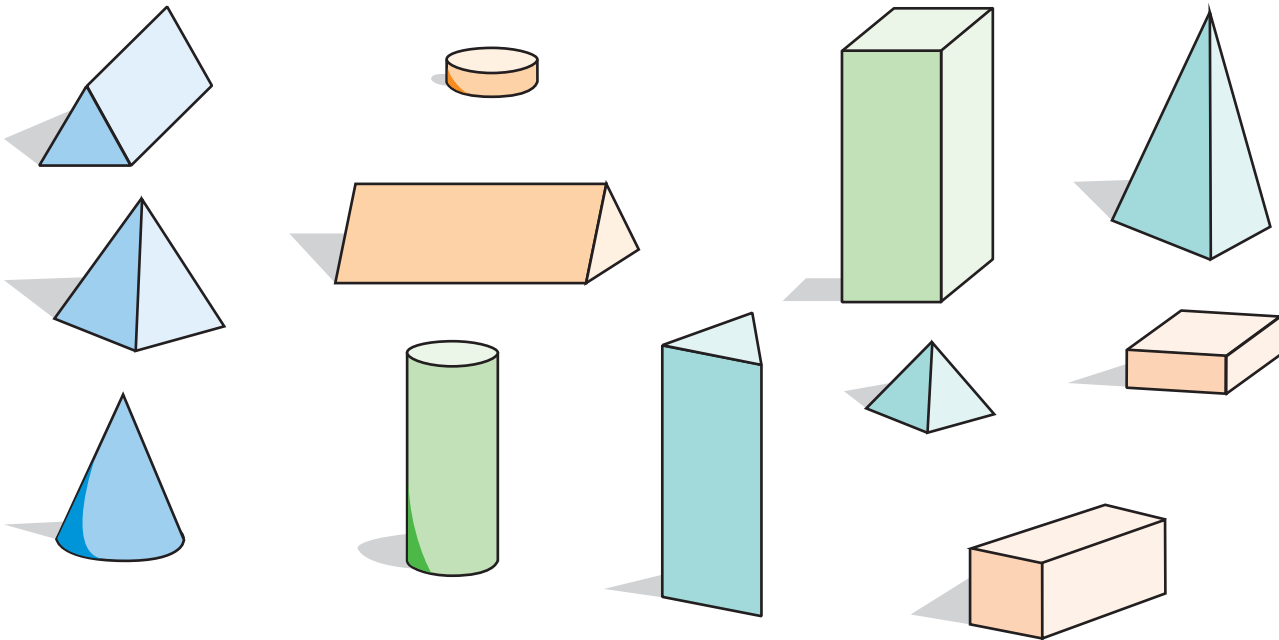
Write the name of the figure that matches each puzzle. Use pyramid, prism, cone, or cylinder.

Clues	Answers
6 ☑ All of my faces are polygons. ☑ None of my faces is parallel to another face.	
7 ☑ Two of my faces are congruent and parallel to each other. ☑ All of my other faces are parallelograms.	
8 ☑ All of my faces are polygons. ☑ I have the same number of faces and vertices.	

9 Challenge

☑ I have exactly two congruent surfaces.

☑ The two surfaces are not polygons.
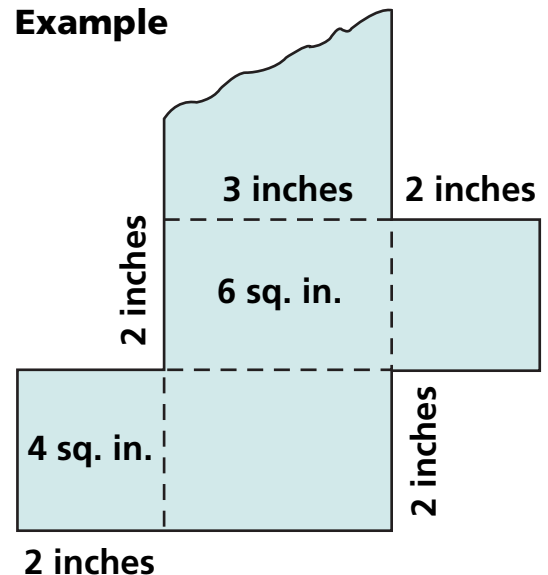
Chapter 11
Lesson 4

Finding the Area of Faces on Three-Dimensional Figures

NCTM Standards 1, 3, 4, 6, 7, 8, 9, 10

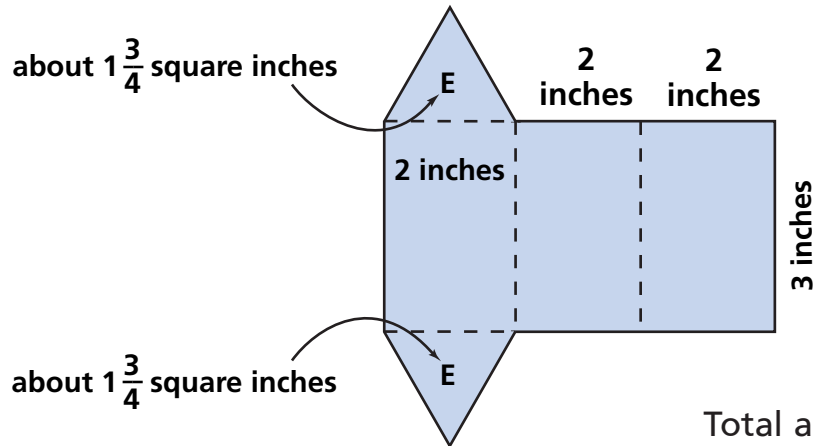**Attach a small copy of the net for your three-dimensional figure here:**

❶ Label your picture to show the full size measurements of each edge of your polyhedron. See the example at the right.

❷ Based on your measurements, label your picture to show the area of each face or surface of your polyhedron.

❸ What is the total area of the faces or surfaces of your polyhedron?

_____

Example

3 inches   2 inches

2 inches

6 sq. in.
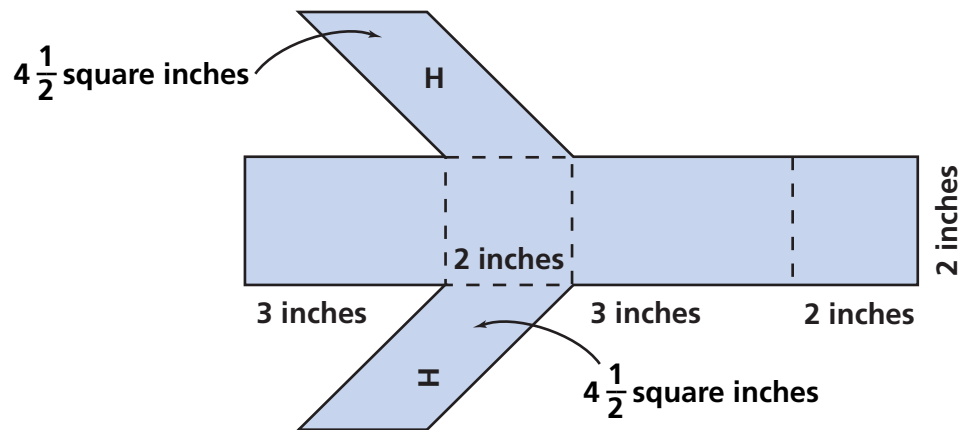
4 sq. in.

2 inches

2 inches

2 inches

These small copies of nets are labeled with the measurements of the three-dimensional figure. Find the total area of the faces of each three-dimensional figure. All the figures whose areas are not given are rectangles.
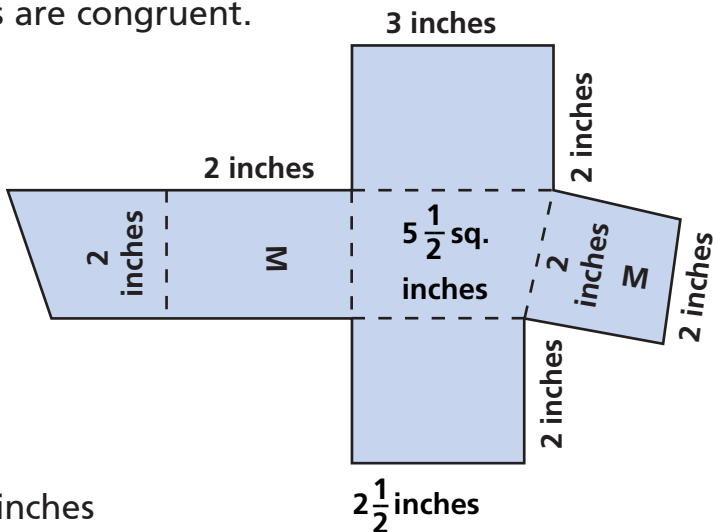
4

about $1\frac{3}{4}$ square inches

E

2 inches 2 inches

2 inches

3 inches

about $1\frac{3}{4}$ square inches E

Total area _____ square inches

5

$4\frac{1}{2}$ square inches

H

2 inches

3 inches   3 inches   2 inches

2 inches

H $4\frac{1}{2}$ square inches

Total area _____ square inches

6 Challenge The trapezoids are congruent.

3 inches

2 inches

2 inches   2 inches

2 inches

M $5\frac{1}{2}$ sq. inches   2 inches   M   2 inches

2 inches

$2\frac{1}{2}$ inches

Total area _____ square inches

Name _____   Date _____

Finding Volumes of Three-Dimensional Figures

NCTM Standards 1, 3, 4, 6, 7, 8, 9, 10

Attach a small copy of the net for your three-dimensional figure here:

Place your three-dimensional figure on the desk so that its bottom and top surfaces are congruent. Build the figure with cube blocks.
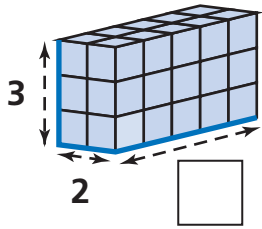
1 How many cubes are in the model? _____ cubes

2 How many cubes are in each layer? _____ cubes

3 How many layers of cubes are there? _____ layers

4 What is the volume of your three-dimensional shape? _____ cubic inches

5

3

2

Number of
cubes in
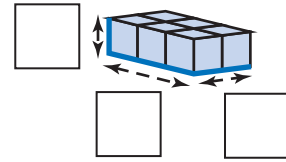each layer: _____ cubes

Volume: _____ cubes

6
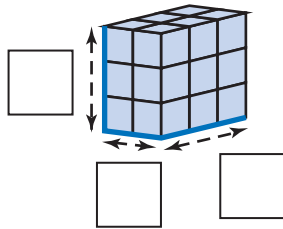
Number of
cubes in
each layer: _____ cubes

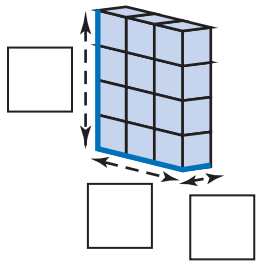Volume: _____ cubes

7

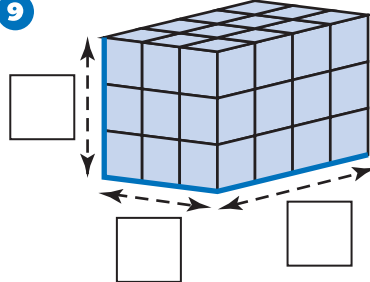Number of
cubes in
each layer: _____ cubes

Volume: _____ cubes

8

Number of
cubes in
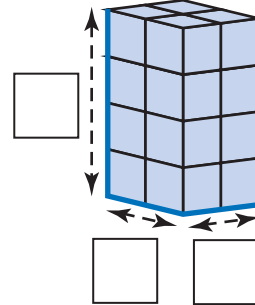each layer: _____ cubes

Volume: _____ cubes

9

Number of
cubes in
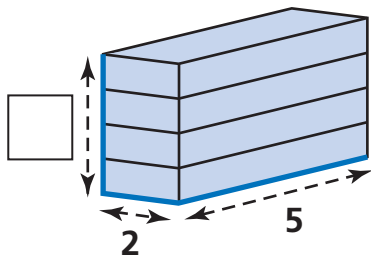each layer: _____ cubes

Volume: _____ cubes

10

Number of
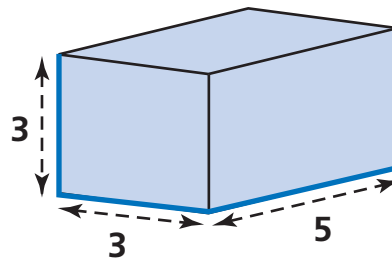cubes in
each layer: _____ cubes

Volume: _____ cubes

11 Challenge

2   5

Number of
cubes in
each layer: _____ cubes

Volume: _____ cubes

12 Challenge

3

3   5

Number of
cubes in
each layer: _____ cubes

Volume: _____ cubes

Name _____ Date _____
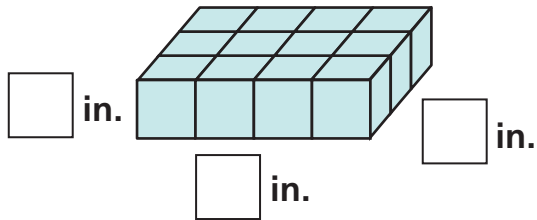
More Volumes of Three-Dimensional Figures

NCTM Standards 1, 3, 4, 6, 7, 8, 9, 10

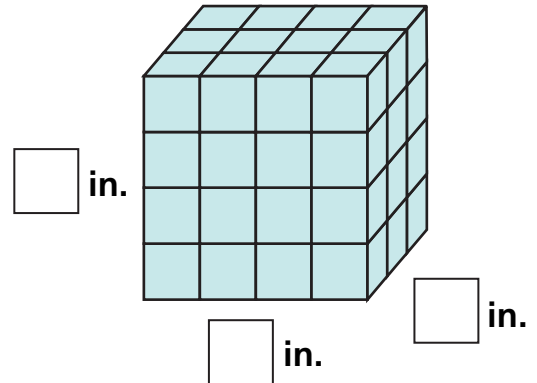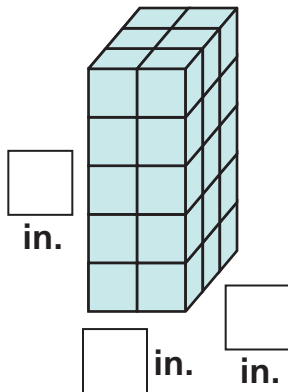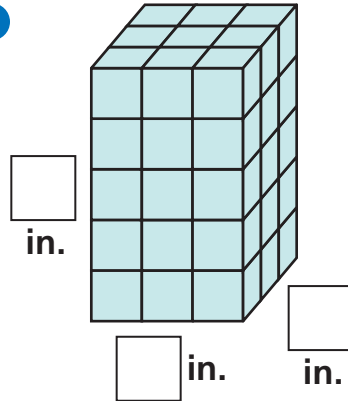## What is the volume of each three-dimensional figure? Each cube is 1 cubic inch.

1 ☐ in. ☐ in. ☐ in.

Volume: _____ cubic inches

2 ☐ in. ☐ in. ☐ in.

Volume: _____ cubic inches

3 ☐ in. ☐ in. ☐ in.

Volume:

_____ cubic inches

4 ☐ in. ☐ in. ☐ in.

Volume:

_____ cubic inches

5 ☐ in. ☐ in. ☐ in.
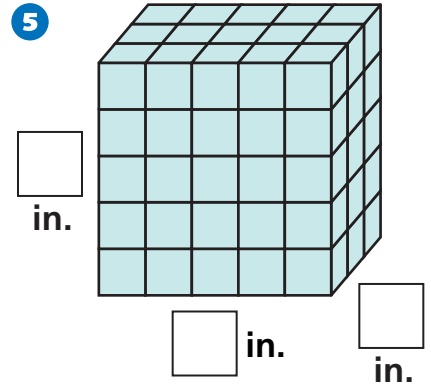
Volume:

_____ cubic inches

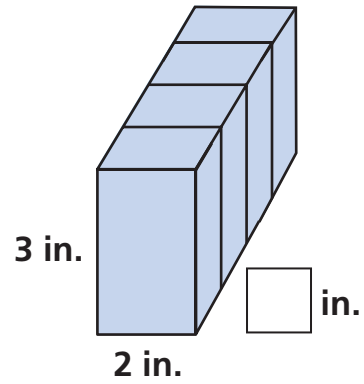**6** Explain how you found the volume of the figure in Problem 5.

_____

_____

_____

Find the volumes of these rectangular prisms in cubic inches.

7

☐ in.

5 in.   4 in.

Volume: _____ cubic inches

8

3 in.

☐ in.

2 in.
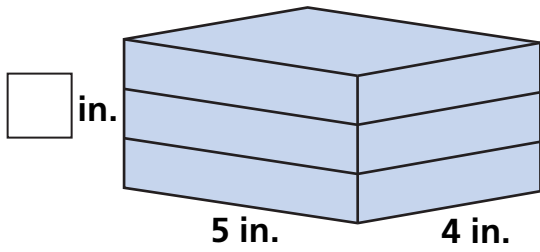
Volume: _____ cubic inches

9

5 in.

8 in.

4 in.
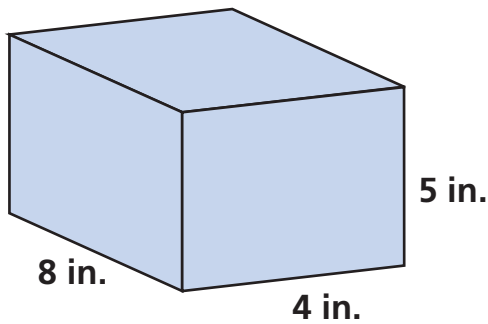
Volume: _____ cubic inches

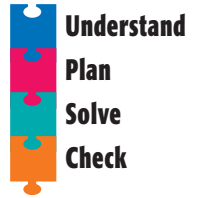**10**

4 in.

3 in.   7 in.
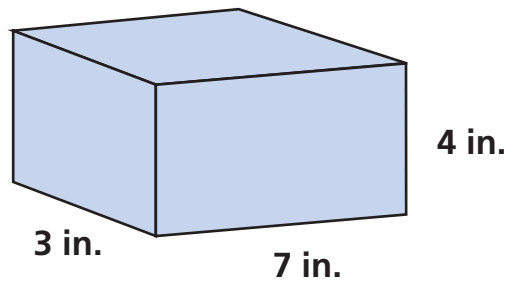
Volume: _____ cubic inches

11 Challenge Think of a prism with a volume of 30 cubic inches. What are the dimensions of the prism you thought of?

☐ in.   ☐ in.   ☐ in.

Name _____   Date _____

Problem Solving Strategy
Act It Out
NCTM Standards 1, 2, 6, 7, 8, 9, 10

Understand
Plan
Solve
Check

1 A cardboard box has a volume of 48 cubic feet. Give four possible sets of measurements that could be its dimensions.

☐ feet ☐ feet ☐ feet   ☐ feet ☐ feet ☐ feet

☐ feet ☐ feet ☐ feet   ☐ feet ☐ feet ☐ feet

2 Melissa folded a net and made a cube.
She measured one of the edges as 4 inches long.
How much paper did she use to make the cube?   _____

3 The Gangulis are painting their bedroom walls.
To figure out how much paint they need, they
will find the area of the walls in the rectangular
room without worrying about windows and doors.
One wall is 10 feet long and the other
wall is 12 feet long. Both walls are
8 feet high.

An estimate of the total area of the

room's four walls is _____ sq ft.

The actual area of the room's four

walls is _____ sq ft.
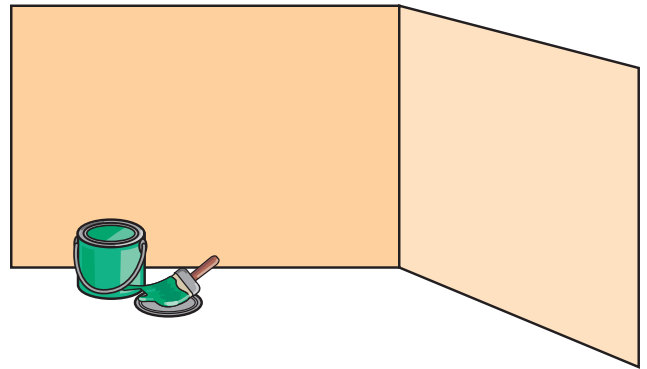
4 Cory is mailing some books that are each 1 inch by
4 inches by $5\frac{1}{2}$ inches. He uses a box that is 4 inches
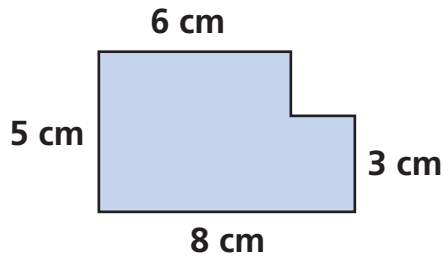by 3 inches by $5\frac{1}{2}$ inches. How many books can he
send in the box?
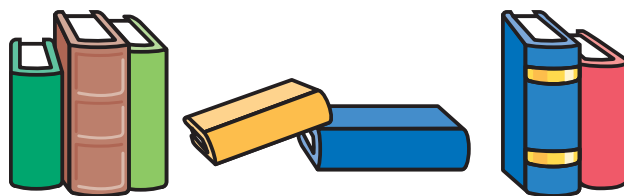
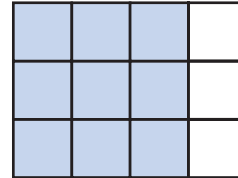_____ books

Problem Solving Test Prep

Choose the correct answer.

1 What are the length and width of a rectangle that has the same perimeter as the figure?

6 cm

5 cm

3 cm

8 cm

A. 3 cm by 6 cm   **C.** 8 cm by 5 cm

B. 3 cm by 8 cm   **D.** 8 cm by 6 cm

2 Which is the best estimate of 391 × 42?

A. 1,200   **C.** 12,000

B. 1,600   **D.** 16,000

3 Which pair of equivalent fractions matches the shaded area of the figure below?

A. $\frac{3}{4}$ $\frac{8}{12}$ **C.** $\frac{1}{4}$ $\frac{3}{12}$

B. $\frac{3}{4}$ $\frac{9}{12}$ **D.** $\frac{2}{3}$ $\frac{8}{12}$

4 Which is the only number that is NOT between 21.8 and 21.9?

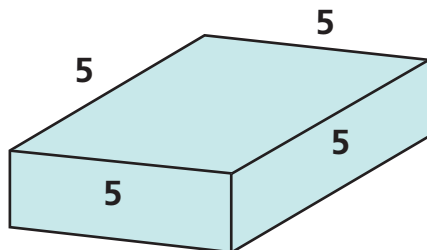**A.** 21.81   **C.** 21.89

B. 21.88   **D.** 21.91

✎ Show What You Know

Solve each problem. Explain your answer.

5 Serena has 43 small cubes. Can she make a rectangular prism using all the cubes? If not, what is the greatest number of cubes she can use? Explain how you decided.

_____

_____

_____

_____

6 Alex has 35 small cubes. He begins building a staircase in which the first step has 1 cube, the next has 2 cubes, and so on. Can he use all 35 cubes? If not, how many will he have left? Explain.

_____

_____

_____

_____

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Review/Assessment

NCTM Standards 1, 2, 6, 7, 8, 9, 10

Name _____   Date _____

All of the faces of this polyhedron are rectangles. Lessons 1, 2, and 3

1 The polyhedron is a: Pyramid   or   Prism   or   Cone

2 How many of the polyhedron's faces are squares?
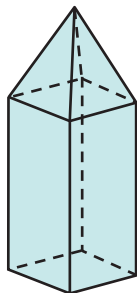
_____ faces

3 Circle a pair of parallel edges.

4 Put on "X" on an edge that is perpendicular to one of the edges you just circled.
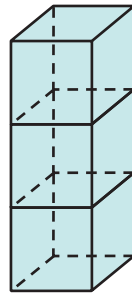
What figures make each tower?

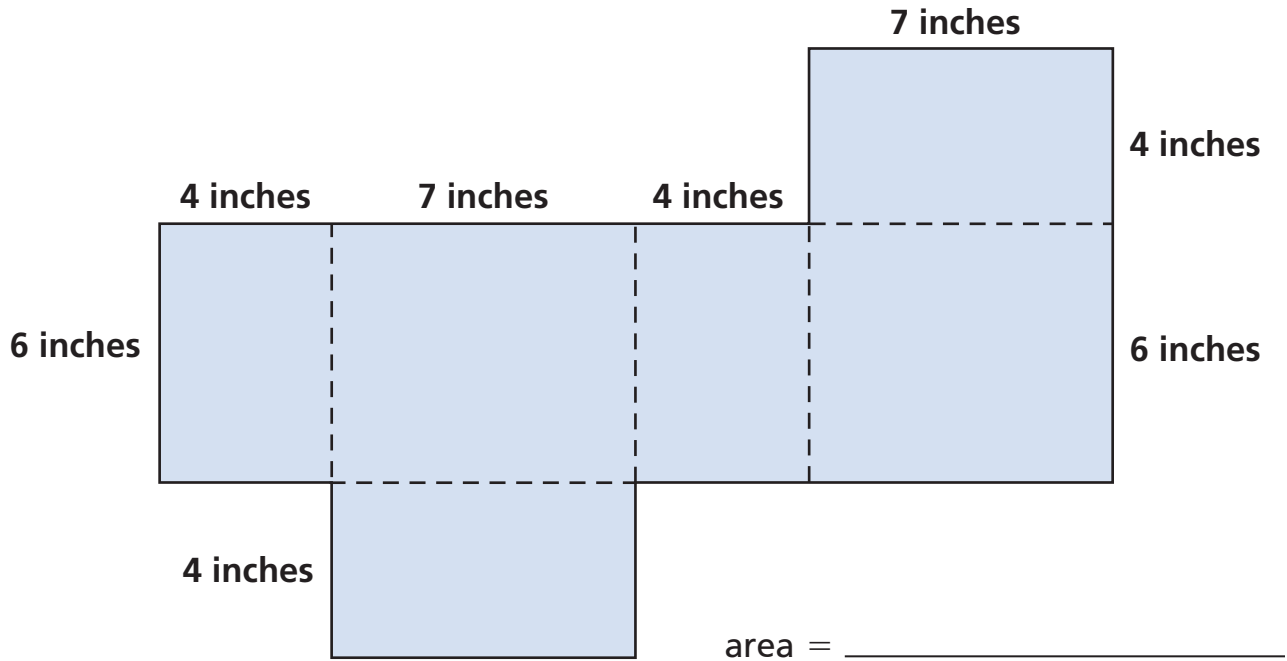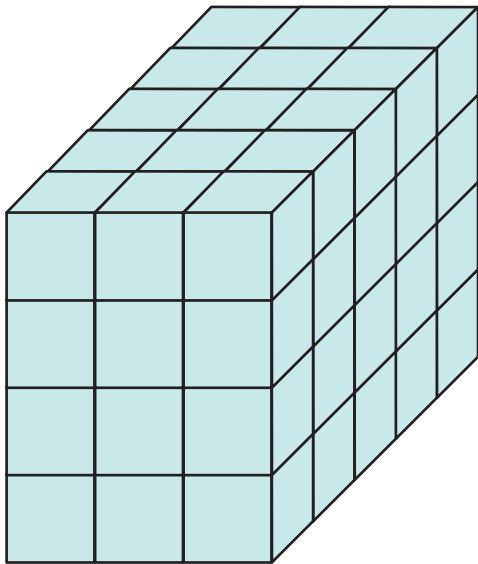**Use Pyramid, Prism, Cone, and Cylinder.** Lesson 3

5

6

7

8 Here is a small copy of a net. All of the figures are rectangles. It is marked with the actual dimensions of the three-dimensional figure. What is the total area of the faces of the three-dimensional figure? **Lesson 4**

7 inches

4 inches

4 inches   **7 inches**   **4 inches**

6 inches   **6 inches**

4 inches

area   _____

9 What is the volume of this rectangular prism? **Lessons 5 and 6**

Volume _____ cubes

10 Alexia is packing her baby sister's toys. There are 27 blocks to pack. After Alexia puts them all into one box, there is no extra space in the box for anything else. What size might the box be? Explain. **Lesson 7**

_____

_____

_____

_____

_____

_____

_____

_____