

Home and School Math



Topics Include:

Improving Your Space, Looking Sharp, Eating Smart,
Getting Around, Communicating, After School,
Family Fun, Hanging Out with Friends

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Unit 1

Improving Your Space

Preview

How You Will Use This Unit

You do many different things as part of improving your space. You may hang wallpaper, add an entertainment center, or reorganize your stuff. As you calculate areas and make decisions, you will often use math. The math skills you use include mental math and estimation, basic operations and equations, area measurements, and statistics.



What You Will Do in This Unit

In this unit, math steps demonstrate how to solve problems. These steps can help you answer questions such as these.

You paint your kitchen walls. The kitchen is 9 feet by 8 feet. The ceiling is 10 feet high. What is the size of the area that you paint?

You move into a new apartment. The bedroom is 10 feet by 12 feet. Your new bed is 4 feet by 7 feet. How much space is left after you set up the bed?

You put a bed skirt around your bed to hide all the stuff underneath. Your bed is 7 feet long by 4 feet wide. The price of fabric is \$2.96 a yard. How much do you spend for the fabric?

In the last year, your friends have stayed over 42 times. What is the mean number of times that your friends have stayed over per month?

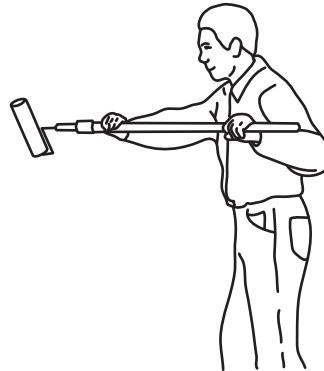
What You Can Learn from This Unit

When you complete this unit, you will have used mathematics to work problems related to improving your space. These problems are similar to those that may actually occur in your daily life.

Lesson 1

Decorating Your Space

Example Melanie and Alex paint their kitchen walls. They do not paint the ceiling or the floor. The kitchen is 9 feet by 8 feet. The ceiling is 10 feet high. Each of the two doors is 3 feet by 7 feet. The one window is 4 feet wide by 3 feet tall. What is the area they paint?



Solve

Step 1: Write an expression using math language for the total area of the 4 walls.

$$2(9 \times 10) + 2(8 \times 10) \text{ square feet} = 340 \text{ square feet}$$

Area is length \times width.

Step 2: Now, write an expression for sum of the areas of the 2 doors and the window.

$$2(3 \times 7) + (4 \times 3) \text{ square feet} = 54 \text{ square feet}$$

This is the total area not painted.

Step 3: Subtract the areas of the doors and the window from the total wall area.

$$(340 - 54) \text{ square feet} = 286 \text{ square feet}$$

Answer the Question

Step 4: Melanie and Alex paint an area of 286 square feet.

Now try these problems.

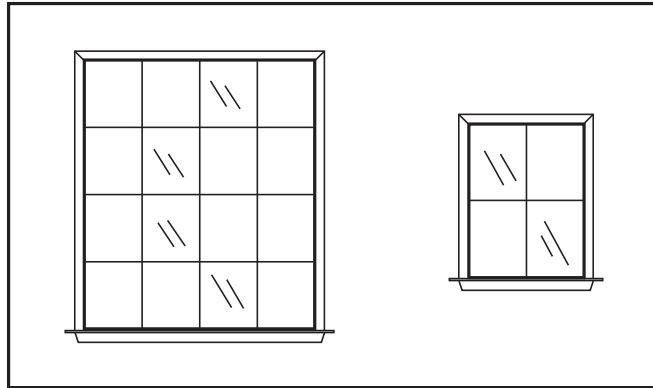
1. Jon paints his bedroom walls. The bedroom is 11 feet by 9 feet. The ceiling is 10 feet high. There is one door and two windows. The door is 3 feet by 7 feet. Each window is 3 feet wide by 4 feet tall. What is the area that he paints?

Answer: Jon paints an area of _____.

2. Andray's study is a space 7 feet by 6 feet. She finds a rug that is 6 feet by 5 feet. She puts the rug on the floor so there is an uncovered border all around it. What is the width of this border?

- A** $\frac{1}{2}$ foot **C** 2 feet
B 1 foot **D** 6 feet

3. Melvin wants to hang a picture between the two windows in his living area. The picture is $3\frac{1}{2}$ feet wide by 4 feet tall. The wall is 17 feet long. One window is 6 feet wide by 7 feet tall. The other window is 3 feet wide by 4 feet tall. There are 2 feet of wall space between each window and the corner. Is there enough space for the picture plus at least 6 inches of wall space around it?



Answer: _____

4. Tracey has $\frac{3}{4}$ of a can of paint. The directions on the can say a *full* can covers 500 square feet. Tracey's room is 15 feet by 12 feet. The ceiling is 8 feet high. She wants to paint her four walls using the $\frac{3}{4}$ can. What must be true about the room for this paint to be enough?

Answer: _____

☆ *Challenge Problem*

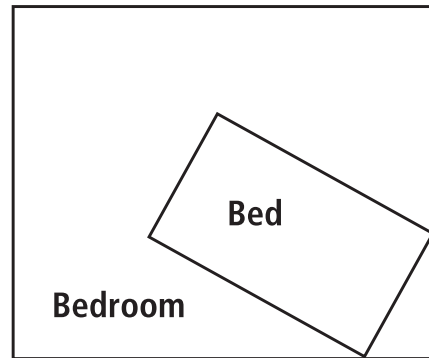
You may want to talk this one over with a partner.

You have a rug in the shape of a parallelogram. The sides measure 4 feet by 5 feet. When is the area of this rug equal to the area of a *rectangular* rug with sides 4 feet by 5 feet? When are the areas not the same? Draw a picture to explain.

Lesson 2

Organizing Your Stuff

Example Brenda's bedroom is 10 feet by 12 feet. Her bed is 4 feet by 7 feet. She angles her bed out from one corner. The head of the bed blocks off a triangular area. The sides of this triangle measure 2 feet on one wall and 3.5 feet on the other wall. How much space is left for her to use?



Solve

Step 1: Underline the dimensions of Brenda's bedroom.

Her bedroom is 10 feet by 12 feet.

Step 2: Multiply these dimensions to find the area of the room.

$$10 \text{ feet} \times 12 \text{ feet} = 120 \text{ square feet}$$

Area (rectangle) is length \times width.

Step 3: Use the same formula to find the area of her bed.

$$4 \text{ feet} \times 7 \text{ feet} = 28 \text{ square feet}$$

Step 4: Find the area of the blocked corner behind the head of her bed.

$$\frac{1}{2} (2 \text{ feet} \times 3.5 \text{ feet}) = 3.5 \text{ square feet}$$

Area (right triangle) is $\frac{1}{2}$ (leg \times leg).

Step 5: Subtract the area of the bed and the blocked corner to find the space left.

$$120 \text{ square feet} - 28 \text{ square feet} - 3.5 \text{ square feet} = 88.5 \text{ square feet}$$

Answer the Question

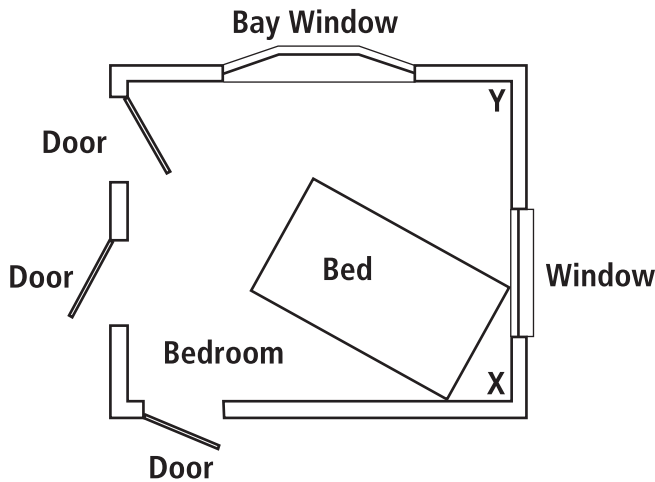
Step 6: Brenda has 88.5 square feet of space left.

Now try these problems.

1. Brenda has 88.5 square feet left after she has set up her bed. Her entertainment center is 4 feet long by $1\frac{1}{2}$ feet wide. She puts it against one wall. Her easy chair is 3 feet by 3 feet square. She sets it in against another wall. Fill in the blanks to show the square feet left after these pieces of furniture are in place.

Answer: $88.5 - \underline{\quad} - \underline{\quad} = \underline{\quad}$.

2. Brenda's entertainment center is 4 feet long and $1\frac{1}{2}$ feet wide. It is 6 feet tall. Her room is 12 feet by 10 feet. The ceiling is 8 feet tall. The bay window is 6 feet wide by 5 feet tall. It is 3 feet from corner Y. The other window is 4 feet wide by 5 feet tall. It is 2 feet from corner X. In the diagram show where you would place the entertainment center. Explain why.



Answer: _____

3. Derek has 158 books. His books fit in his six bookshelves. They fill five shelves. The sixth bookshelf is half empty. About how many books fit on one bookshelf?

A 14 **B** 26 **C** 29 **D** 32

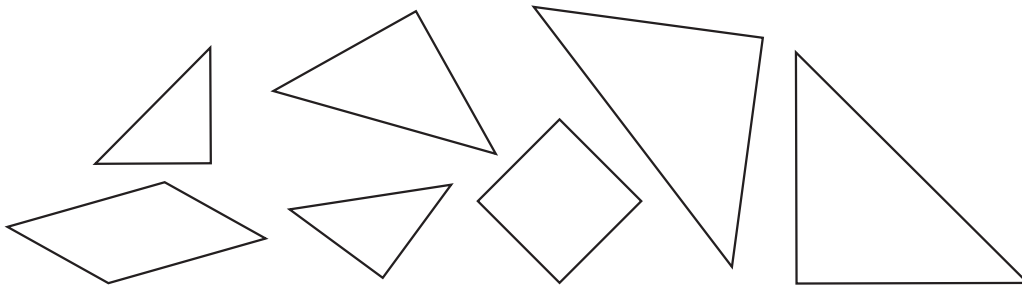
4. Bryan sets up his computer on his L-shaped desk. The two legs of the L are the same length. The desk and the chair take up a square area in one corner of his room. One side of the square is $3\frac{1}{2}$ feet. Find the area of the space the desk and chair take up.

Answer: _____

☆ Challenge Problem

You may want to talk this one over with a partner.

What regular polygon can be made with these seven pieces?



Answer: _____

Lesson 3

Make That Shape!

♠ A Card Game (for Two or More Players)

The goal of this game is to form polygons from geometric-shaped cards. First, you get six cards. You can discard cards and pick up new ones. You use as many of your cards as you can to make a polygon. **Make polygons such as these:** triangle, square, rectangle, parallelogram, trapezoid.

Materials

These cards: 12 A; 12 B; 3 C; 12 D; 3 E (see next page).

Key board (on the next page) showing the basic shape relationships.

Directions

1. Place the key board in the center of the playing area. The key board reminds you of basic relationships among the card shapes. Mix the card shapes and stack them.
2. One player gives six cards to each player. Place the rest of the cards in a stack. One player writes down the scores for each player.
3. Players look at their cards. Each player decides what shape to make, using as many cards as possible. The first player then discards a card and picks up one card from the stack.
4. Players alternate turns until one player is ready to make a shape. That player names the shape and makes it with cards. One shape may have several names. For example, a square is a rectangle and a parallelogram. If the other players agree, then the recorder writes down that player's score. The score is the number of cards that make the shape. The player then picks enough cards from the stack to make six again. If other players disagree, then the unsuccessful player picks up the cards and waits for the next turn.
5. When one player is out of cards and there are no more spare cards, the game is over. The winner is the player with the most points.

Before you play the game, try this warm-up problem.

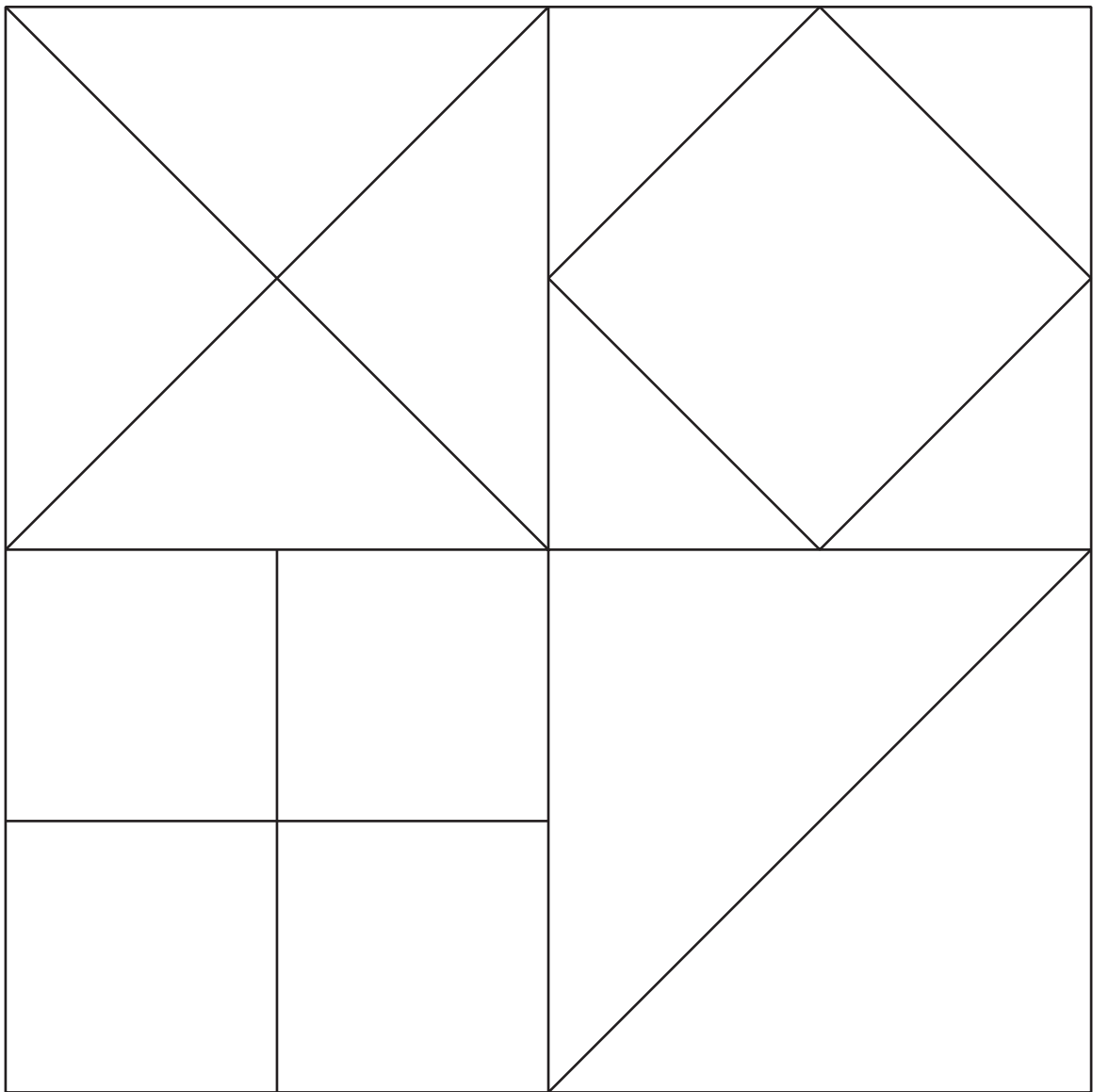
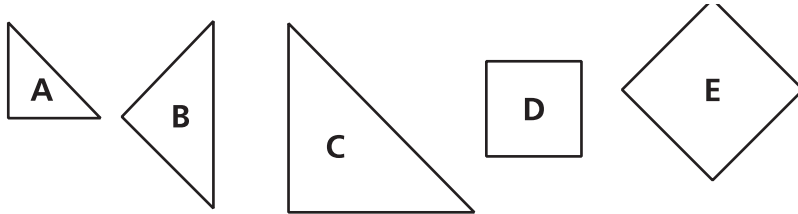
1. How many different shapes can you make with 2 of the A shapes? What are they?

Answer: _____

Key Board for *Make That Shape!*

Directions: Make one copy of this page to use as the Key Board.

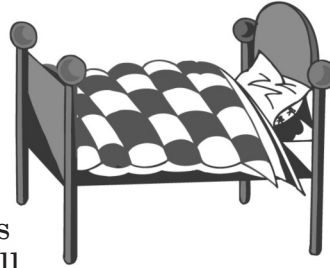
Then make 3 more copies of this page. Use these three copies to make pieces for the cards. Cut along the lines to make the shapes for the cards.



Lesson 4

Making Additions

Example Eric wants to put a bed skirt around his bed to hide all the stuff underneath. His bed is 7 feet long by 4 feet wide. The head of the bed is against the wall. This means that the bed skirt goes around only 3 sides of the bed. To make the skirt, Eric will sew a strip of fabric that is 18 inches wide. The strip he makes will be 3 times the length of the finished bed skirt. The fabric that Eric plans to buy is 36 inches wide and costs \$2.96 a yard. How much will Eric spend on the fabric?



Solve

Step 1: Underline the sentence that tells which side of his bed does not need a bed skirt.

He does not need a bed skirt for the head of the bed.

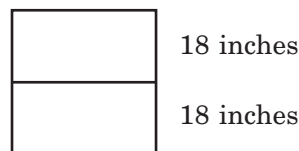
Step 2: Now, write math sentences to find the length of fabric he needs.

$(2 \times 7) + 4 \text{ feet} = 18 \text{ feet}$ The finished bed skirt will be a strip of fabric 18 feet long.

Since his strip needs to be 3 times this long, multiply.

$18 \text{ feet} \times 3 = 54 \text{ feet}$ The extra fabric is for the pleats in the bed skirt.

Each yard of fabric is 36 inches long and 36 inches wide.



But each yard of fabric is 36 inches wide, and the bed skirt is only 18 inches wide.

$36 \div 18 = 2$ Each yard of fabric will make two pieces 18-inches wide.

$54 \div 2 = 27$ Eric will need only $(54 \div 2)$ feet of fabric.

Step 3: Convert this number to yards. Multiply by the price per yard to find the cost.

$27 \text{ feet} \div 3 = 9 \text{ yards}$

$9 \times \$2.96 = \26.64

Answer the Question

Step 4: Eric spends \$26.64 on the fabric for his bed.