

Problem 3.1 A Model for Multiplication

All the pans of brownies are square. A pan of brownies costs \$12. You can buy any fractional part of a pan of brownies and pay that fraction of \$12. For example, $\frac{1}{3}$ of a pan costs $\frac{1}{3}$ of \$12.

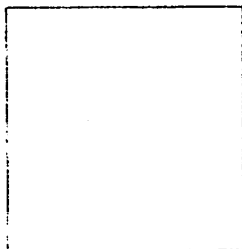
A. Mr. Williams asks to buy $\frac{1}{3}$ of a pan that is $\frac{2}{3}$ full.

1. Use a copy of the brownie pan model shown at the right. Draw a picture to show how the brownie pan might look before Mr. Williams buys his brownies.

2. Use a different colored pencil to show the part of the brownies that Mr. Williams buys. Note that Mr. Williams buys a *part of a part* of the brownie pan.

3. What fraction of a whole pan does Mr. Williams buy? What does he pay?

Model of a Brownie Pan



B. Aunt Serena buys $\frac{3}{4}$ of another pan that is half full.

1. Draw a picture to show how the brownie pan might look before Aunt Serena buys her brownies.

2. Use a different colored pencil to show the part of the brownies that Aunt Serena buys.

3. What fraction of a whole pan does Aunt Serena buy? How much did she pay?

C. When mathematicians write $\frac{1}{2}$ of $\frac{1}{4}$, they mean the operation of multiplication, or $\frac{1}{2} \times \frac{1}{4}$. When you multiply a fraction by a fraction, you are finding "a part of a part." Think of each example below as a brownie-pan problem in which you are buying part of a pan that is partly full—a part of a part.

1. $\frac{1}{3} \times \frac{1}{4}$ 2. $\frac{1}{4} \times \frac{2}{3}$ 3. $\frac{1}{3} \times \frac{3}{4}$ 4. $\frac{3}{4} \times \frac{2}{5}$

D. Use estimation to decide if each product is greater than or less than 1. To help, use the "of" interpretation for multiplication. For example, in part (1), think " $\frac{5}{6}$ of $\frac{1}{2}$."

1. $\frac{5}{6} \times \frac{1}{2}$ 2. $\frac{5}{6} \times 1$ 3. $\frac{5}{6} \times 2$ 4. $\frac{3}{7} \times 2$

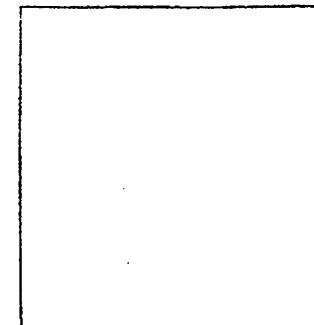
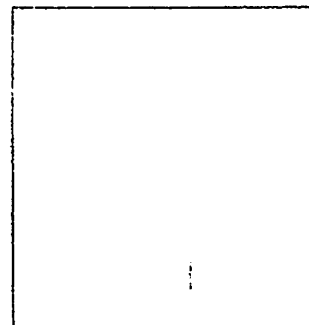
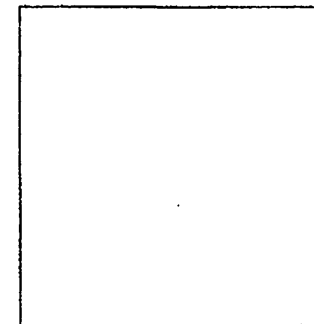
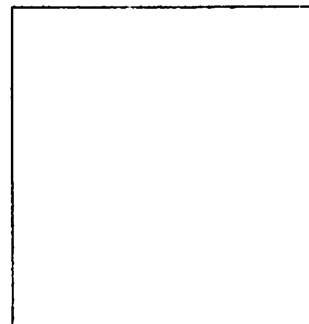
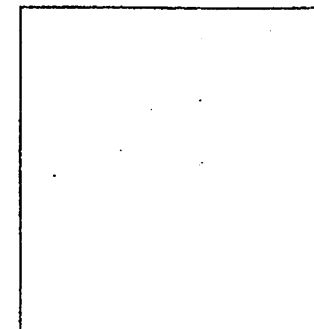
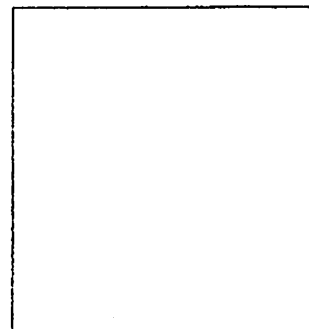
5. $\frac{3}{4} \times \frac{3}{4}$ 6. $\frac{1}{2} \times \frac{9}{3}$ 7. $\frac{1}{2} \times \frac{10}{7}$ 8. $\frac{9}{10} \times \frac{10}{7}$

ACE Homework starts on page 40.

Labsheet 3.1

Bits and Pieces II

Brownie Pans



Solve the following:

1. $\frac{1}{2} \times \frac{4}{7} =$

2. $\frac{3}{5} \times \frac{1}{4} =$

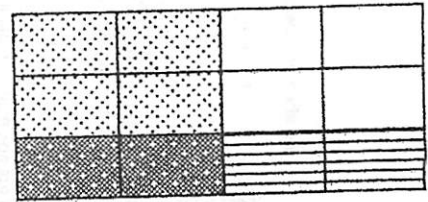
3. $\frac{2}{3} \times \frac{9}{10} =$

4. $\frac{1}{5} \times \frac{4}{5} =$

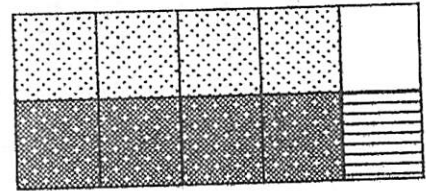
5.NF.6

Use the models below to write an equation to represent multiplication of fractions:

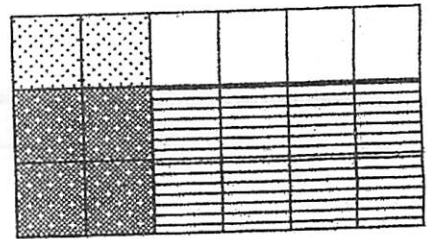
5.



6.



7.

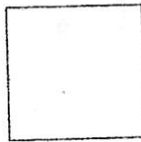


8. Charlie ordered $\frac{8}{9}$ of a pound of jelly beans. He would like to share $\frac{1}{2}$ of it with a friend. How many pounds of jelly beans will each person receive?

5.NF.6

9. What is the area of the square below?

$\frac{5}{6}$ feet



5.NF.6

Fast Facts

4. Cooking More Chili

Andy and Billy have a bagel bakery and restaurant. They have decided to create a new vegetarian chili for their customers. In testing recipes, they make small amounts until they find one they like. In cooking for the restaurant, they will use a much bigger pot. The pot they have is $5\frac{1}{2}$ times as big as the tester pot. They have decided on the recipe below. Use this recipe to create the version they should give to their chili cook. The conversion tables that follow the recipe will help you with your calculations.



Test Recipe Amounts

$1\frac{1}{2}$ pounds

$\frac{1}{2}$ pound

$\frac{1}{2}$ pound

Ingredient

chopped onions

chopped green pepper

carrots

Full Recipe Amounts
