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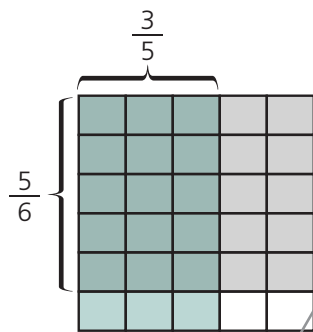
LESSON

3

Multiplying Fractions

You can use a **rectangular model** to multiply fractions.

Kendra is weaving a small rug. The rug will be $\frac{3}{5}$ yard wide by $\frac{5}{6}$ yard long. What is the area of the rug?



To find the rug's area, multiply the length and width: $\frac{3}{5} \times \frac{5}{6}$.
Draw a rectangular model. Divide a rectangle into fifths horizontally and sixths vertically.

First, shade $\frac{3}{5}$ of the rectangle one way. Then shade $\frac{5}{6}$ of the rectangle another way.

There are 30 units in the rectangle in all. Of the 30 units, 15 are shaded both ways. The fraction that represents this amount is $\frac{15}{30}$.

You can write $\frac{15}{30}$ as $\frac{1}{2}$ in lowest terms.

The rug has an area of $\frac{1}{2}$ square yard.

You can also use a rule to find the product of any two fractions.

$$\begin{array}{l} \text{Multiply the numerators.} \rightarrow \frac{3}{5} \times \frac{5}{6} = \frac{3 \times 5}{5 \times 6} = \frac{15}{30} \\ \text{Multiply the denominators.} \rightarrow \end{array}$$

Always reduce the product to lowest terms: $\frac{15}{30} = \frac{1}{2}$

You can also divide the rectangle into sixths horizontally and fifths vertically. You will get the same product.

Remember that the commutative property says you can multiply two numbers in any order.

$$\begin{array}{l} \frac{3}{5} \times \frac{5}{6} \\ \text{is the same as} \\ \frac{5}{6} \times \frac{3}{5} \end{array}$$

The general rule for multiplying fractions is

$$\frac{a}{b} \times \frac{c}{d} = \frac{ac}{bd}$$

where $b, d \neq 0$

GUIDED PRACTICE

Read and solve each problem.

- 1 A cornfield is $\frac{7}{9}$ kilometer by $\frac{2}{3}$ kilometer in size. What is the area of the cornfield?

- A $\frac{9}{12}$ square kilometer
B $\frac{14}{27}$ square kilometer
C $\frac{3}{4}$ square kilometer
D $\frac{1}{2}$ square kilometer

To find the area of the cornfield, multiply the dimensions.

- 2 Harry has $1\frac{1}{2}$ kilograms of whole-wheat flour. He uses $\frac{3}{4}$ of the flour to bake bread. How much flour did he use?

Answer _____

A mixed number is easier to multiply if it is an improper fraction.

- 3 Draw a rectangular model to show how to find $\frac{1}{3} \times \frac{5}{6}$. What is the product?

How many parts should you divide it into vertically?
How many parts should you divide it horizontally?

Answer _____

TEST YOURSELF

Read and solve each problem.

- 1 What is the product of $\frac{3}{5}$ and $\frac{2}{3}$ in lowest terms?
- A $\frac{6}{15}$ C $\frac{2}{5}$
B $\frac{5}{8}$ D $\frac{1}{3}$
- 2 A track is $\frac{3}{4}$ mile long. Rafael runs $\frac{2}{5}$ of the track. In lowest terms, what distance does Rafael run?
- A $\frac{5}{9}$ mile C $\frac{6}{20}$ mile
B $\frac{6}{9}$ mile D $\frac{3}{10}$ mile
- 3 Multiply $\frac{4}{5} \times \frac{1}{8}$. What is the product in lowest terms?
- A $\frac{1}{10}$ C $\frac{1}{40}$
B $\frac{5}{13}$ D $\frac{4}{40}$
- 4 The dimensions of a postage stamp are $\frac{3}{4}$ inch by $\frac{7}{8}$ inch. What is the area of the stamp?
- A $\frac{5}{6}$ square inch C $\frac{5}{16}$ square inch
B $\frac{7}{11}$ square inch D $\frac{21}{32}$ square inch
- 5 Zoe has a piece of fabric that is $\frac{2}{3}$ yard long. She uses $\frac{7}{12}$ of the piece in a costume. What part of a yard does Zoe use?
- A $\frac{3}{5}$ C $\frac{7}{18}$
B $\frac{9}{15}$ D $\frac{14}{36}$
- 6 Sam has $\frac{1}{3}$ of a pizza. He eats $\frac{3}{4}$ of his section. In lowest terms, how much of the whole pizza does he eat?
- A $\frac{1}{2}$ C $\frac{4}{7}$
B $\frac{1}{4}$ D $\frac{3}{12}$
- 7 A window is $\frac{3}{4}$ meter high, and $\frac{2}{3}$ of it is covered with frosted glass. What part of a square meter is frosted glass? Draw a rectangular model to show how to find the answer.

Answer _____

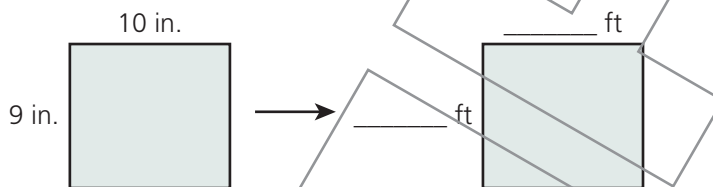
8 A computer screen measures $\frac{8}{12}$ foot by $\frac{10}{12}$ foot. What is the screen's area?

Answer _____

9 A landscaper delivered $\frac{9}{10}$ ton of mulch to a job site. Workers spread $\frac{1}{3}$ of this amount around trees. What amount did the workers spread around trees?

Answer _____

10 Saroya needs to cover the floor of a small closet with carpet tiles. Each carpet tile measures 9 inches by 10 inches.



Part A What is each dimension as a fraction of a foot? Label the drawing above. Then find the area of each tile in square feet. Explain how you found your answers.

Part B The area of the closet floor is 18 square feet. If Saroya buys 32 tiles, will she have enough to cover the floor? Explain your answer.
