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## Find Part of a Group

Lauren bought 12 stamps for postcards. She gave Brianna  $\frac{1}{6}$  of them. How many stamps did Lauren give to Brianna?



Find  $\frac{1}{6}$  of 12.

**Step 1** What is the denominator in the fraction of the stamps Lauren gave to Brianna? **6**

So, divide the 12 stamps into 6 equal groups. Circle the groups.



**Step 2** Each group represents  $\frac{1}{6}$  of the stamps.

How many stamps are in 1 group? **2**

So,  $\frac{1}{6}$  of 12 is 2, or  $\frac{1}{6} \times 12$  is 2.

So, Lauren gave Brianna 2 stamps.

Use a model to solve.

1.  $\frac{3}{4} \times 12 =$  \_\_\_\_\_

2.  $\frac{1}{3} \times 9 =$  \_\_\_\_\_

3.  $\frac{3}{5} \times 20 =$  \_\_\_\_\_

4.  $\frac{4}{6} \times 18 =$  \_\_\_\_\_

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## Multiply Fractions and Whole Numbers

Find the product.  $\frac{3}{8} \times 4$

**Step 1** Draw 4 rectangles to represent the factor 4.



**Step 2** The denominator of the factor  $\frac{3}{8}$  is 8. So, divide the 4 rectangles into 8 equal parts.



**Step 3** The numerator of the factor  $\frac{3}{8}$  is 3. So, shade 3 of the parts.



**Step 4** The 4 rectangles have 3 shaded parts. Each rectangle is divided into 2 equal parts. So,  $\frac{3}{2}$  of the rectangles are shaded.

So,  $\frac{3}{8} \times 4$  is  $\frac{3}{2}$ , or  $1\frac{1}{2}$ .

Find the product.

1.  $\frac{5}{12} \times 4 =$  \_\_\_\_\_      2.  $8 \times \frac{3}{4} =$  \_\_\_\_\_      3.  $\frac{7}{9} \times 3 =$  \_\_\_\_\_

4.  $5 \times \frac{4}{7} =$  \_\_\_\_\_      5.  $\frac{9}{10} \times 5 =$  \_\_\_\_\_      6.  $3 \times \frac{3}{4} =$  \_\_\_\_\_

7.  $\frac{7}{12} \times 6 =$  \_\_\_\_\_      8.  $12 \times \frac{2}{9} =$  \_\_\_\_\_      9.  $\frac{2}{9} \times 3 =$  \_\_\_\_\_

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## Fraction and Whole Number Multiplication

Find the product.  $3 \times \frac{5}{6}$

$$3 \times \frac{5}{6} = \frac{3}{1} \times \frac{5}{6}$$

Write the whole-number factor, 3, as  $\frac{3}{1}$ .

$$= \frac{3 \times 5}{1 \times 6}$$

Multiply the numerators. Then multiply the denominators.

$$= \frac{15}{6}$$

$$= 2\frac{3}{6}, \text{ or } 2\frac{1}{2}$$

Write the product as a mixed number in simplest form.

So,  $3 \times \frac{5}{6}$  is  $2\frac{1}{2}$ .

Find the product. Write the product in simplest form.

1.  $\frac{2}{3} \times 8 = \frac{2}{3} \times \frac{8}{1}$

2.  $4 \times \frac{2}{9} =$  \_\_\_\_\_

$$= \frac{\square \times \square}{\square \times \square}$$

$$= \frac{\square}{\square}, \text{ or } \underline{\hspace{2cm}}$$

3.  $6 \times \frac{3}{4} =$  \_\_\_\_\_

4.  $\frac{4}{9} \times 3 =$  \_\_\_\_\_

5.  $5 \times \frac{3}{8} =$  \_\_\_\_\_

6.  $9 \times \frac{2}{3} =$  \_\_\_\_\_

7.  $2 \times \frac{5}{6} =$  \_\_\_\_\_

8.  $7 \times \frac{4}{10} =$  \_\_\_\_\_

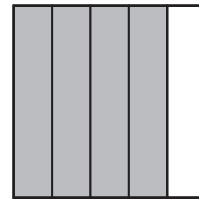
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# Multiply Fractions

You can use a model to help you multiply two fractions.

**Multiply.**  $\frac{1}{3} \times \frac{4}{5}$

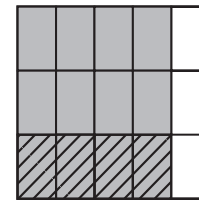
**Step 1** Draw a rectangle. Divide it into 5 equal columns. To represent the factor  $\frac{4}{5}$ , shade 4 of the 5 columns.



**Step 2** Now divide the rectangle into 3 equal rows. Shade  $\frac{1}{3}$  of the  $\frac{4}{5}$  you already shaded.

The rectangle is divided into **15** smaller rectangles. This is the denominator of the product.

There are 4 smaller rectangles that contain both types of shading. So, **4** is the numerator of the product.

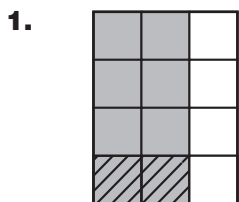


So  $\frac{4}{15}$  of the rectangles contain both types of shading.

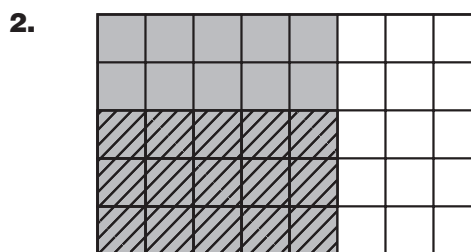
**Think:** What is  $\frac{1}{3}$  of  $\frac{4}{5}$ ?

$$\frac{1}{3} \times \frac{4}{5} = \underline{\frac{4}{15}}$$

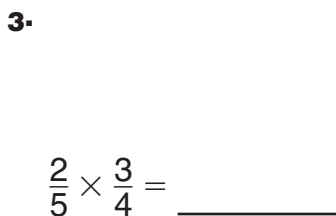
**Find the product. Draw a model.**



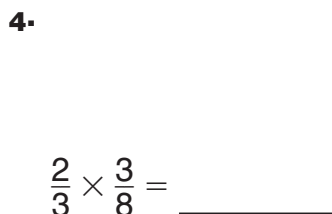
$$\frac{1}{4} \times \frac{2}{3} = \underline{\hspace{2cm}}$$



$$\frac{3}{5} \times \frac{5}{8} = \underline{\hspace{2cm}}$$



$$\frac{2}{5} \times \frac{3}{4} = \underline{\hspace{2cm}}$$



$$\frac{2}{3} \times \frac{3}{8} = \underline{\hspace{2cm}}$$

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## Compare Fraction Factors and Products

You can use a model to determine how the size of the product compares to the size of one factor when multiplying fractions.

**The factor is 1:**  $\frac{2}{3} \times 1$

- Draw a model to represent the factor 1.  
Divide it into 3 equal sections.

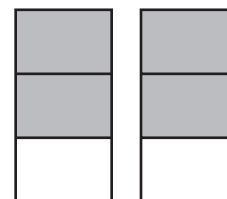
• Shade 2 of the 3 sections to represent the factor  $\frac{2}{3}$ .  
 $\frac{2}{3}$  of the rectangle is shaded. So,  $\frac{2}{3} \times 1$  is equal to  $\frac{2}{3}$ .



**The factor is greater than 1:**  $\frac{2}{3} \times 2$

- Draw two rectangles to represent the factor 2.  
Divide each rectangle into 3 equal sections.

• Shade 2 of 3 sections in each to represent the factor  $\frac{2}{3}$ .  
In all, 4 sections are shaded, which is greater than the number of sections in one rectangle. So,  $\frac{2}{3} \times 2$  is greater than  $\frac{2}{3}$ .



**The factor is less than 1:**  $\frac{2}{3} \times \frac{1}{6}$

- Draw a rectangle. Divide it into 6 equal columns.  
Shade 1 of the 6 columns to represent the factor  $\frac{1}{6}$ .
- Now divide the rectangle into 3 equal rows. Shade 2 of the 3 rows of the section already shaded to represent the factor  $\frac{2}{3}$ .

The rectangle is divided into 18 sections. 2 of the sections are shaded twice. 2 sections is less than the 3 sections that represent  $\frac{1}{6}$ .

So,  $\frac{2}{3} \times \frac{1}{6}$  is less than  $\frac{1}{6}$ .



Complete the statement with *equal to*, *greater than*, or *less than*.

1.  $\frac{3}{7} \times \frac{2}{5}$  will be \_\_\_\_\_  $\frac{3}{7}$ .

2.  $\frac{7}{8} \times 3$  will be \_\_\_\_\_  $\frac{7}{8}$ .

3.  $\frac{1}{6} \times \frac{5}{5}$  will be \_\_\_\_\_  $\frac{1}{6}$ .

4.  $5 \times \frac{6}{7}$  will be \_\_\_\_\_ 5.