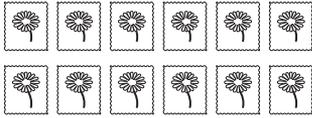


Name _____

Find Part of a Group

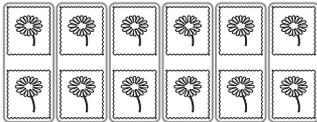
Lauren bought 12 stamps for postcards. She gave Brianna $\frac{1}{6}$ of them. How many stamps did Lauren give to Brianna?



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

Name _____

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

Name _____

Fraction and Whole Number Multiplication

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

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

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

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

Multiply the numerators. Then multiply the denominators.

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

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

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

2. $4 \times \frac{2}{9} = \underline{\hspace{2cm}}$

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

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

3. $6 \times \frac{3}{4} = \underline{\hspace{2cm}}$

4. $\frac{4}{9} \times 3 = \underline{\hspace{2cm}}$

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

6. $9 \times \frac{2}{3} = \underline{\hspace{2cm}}$

7. $2 \times \frac{5}{6} = \underline{\hspace{2cm}}$

8. $7 \times \frac{4}{10} = \underline{\hspace{2cm}}$

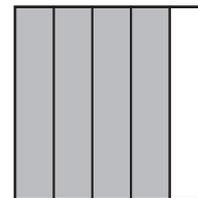
Name _____

Multiply Fractions

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

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

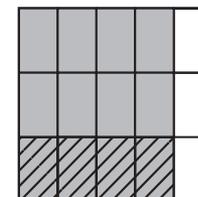
Step 1 Draw a rectangle. Divide it into 5 equal columns.
To represent the factor $\frac{4}{5}$, shade 4 of the 5 columns.



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.

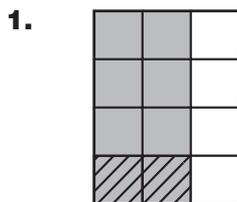


So $\frac{4}{15}$ of the rectangles contain both types of shading.

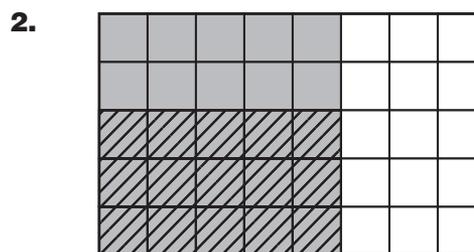
Think: What is $\frac{1}{3}$ of $\frac{4}{5}$?

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

Find the product. Draw a model.



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



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

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

4.
$$\frac{2}{3} \times \frac{3}{8} = \underline{\hspace{2cm}}$$

Name _____

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 $\frac{2}{3}$.

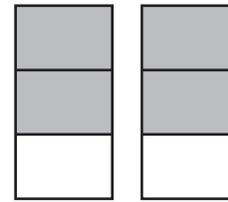


The factor is greater than 1: $\frac{2}{3} \times 2$

- 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.

Name _____

Fraction Multiplication

To multiply fractions, you can multiply the numerators, then multiply the denominators. Write the product in simplest form.

Multiply. $\frac{3}{10} \times \frac{4}{5}$

Step 1 Multiply the numerators. Multiply the denominators.

$$\begin{aligned}\frac{3}{10} \times \frac{4}{5} &= \frac{3 \times 4}{10 \times 5} \\ &= \frac{12}{50}\end{aligned}$$

Step 2 Write the product in simplest form.

$$\begin{aligned}\frac{12}{50} &= \frac{12 \div 2}{50 \div 2} \\ &= \frac{6}{25}\end{aligned}$$

So, $\frac{3}{10} \times \frac{4}{5}$ is $\frac{6}{25}$.

Find the product. Write the product in simplest form.

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

2. $\frac{4}{7} \times \frac{5}{12}$

3. $\frac{3}{8} \times \frac{2}{9}$

4. $\frac{4}{5} \times \frac{5}{8}$

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

6. $\frac{3}{4} \times 8$

7. $\frac{5}{8} \times \frac{2}{3}$

8. $\frac{5}{6} \times \frac{3}{8}$

Name _____

Area and Mixed Numbers

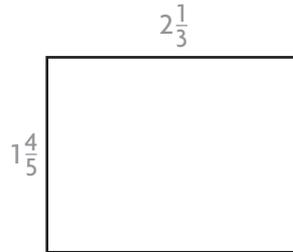
You can use an area model to help you multiply mixed numbers.

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

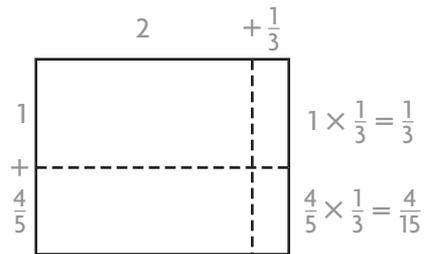
Step 1 Rewrite each mixed-number factor as the sum of a whole number and a fraction.

$$1\frac{4}{5} = 1 + \frac{4}{5} \text{ and } 2\frac{1}{3} = 2 + \frac{1}{3}$$

Step 2 Draw an area model to show the original multiplication problem.



Step 3 Draw dashed lines, and label each section to show how you broke apart the mixed numbers in Step 1.



Step 4 Find the area of each section.

$$1 \times 2 = \underline{2}$$

$$1 \times \frac{1}{3} = \underline{\frac{1}{3}}$$

$$\frac{4}{5} \times 2 = \underline{\frac{8}{5}}$$

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

Step 5 Add the areas of each of the sections to find the total area of the rectangle.

$$2 + \frac{1}{3} + \frac{8}{5} + \frac{4}{15} = \frac{30}{15} + \frac{5}{15} + \frac{24}{15} + \frac{4}{15}$$

$$= \frac{63}{15}, \text{ or } \underline{4\frac{1}{5}}$$

So, $1\frac{4}{5} \times 2\frac{1}{3}$ is $\underline{4\frac{1}{5}}$.

Use an area model to solve.

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

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

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

Name _____

Compare Mixed Number Factors and Products

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

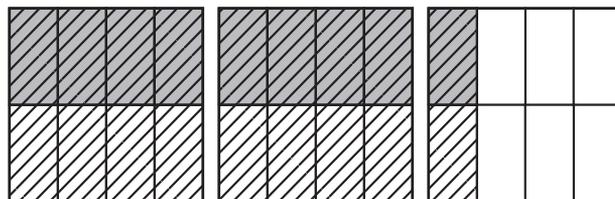
$$1 \times 1\frac{3}{4} \text{ is } \underline{\quad? \quad} 1\frac{3}{4}.$$

The Identity Property of Multiplication states that the product of

1 and any number is that number. So, $1 \times 1\frac{3}{4}$ is **equal to** $1\frac{3}{4}$.

$$\frac{1}{2} \times 2\frac{1}{4} \text{ is } \underline{\quad? \quad} 2\frac{1}{4}.$$

Draw three rectangles. Divide each rectangle into 4 equal columns.



Shade completely the first two rectangles to represent 2 and one column of the last rectangle to represent $\frac{1}{4}$.

Divide the rectangles into 2 rows. Shade one row to represent the factor $\frac{1}{2}$.

18 small rectangles are shaded. 9 rectangles have both types of shading. 9 rectangles is less than the 18 rectangles that represent $2\frac{1}{4}$.

$$\text{So, } \frac{1}{2} \times 2\frac{1}{4} \text{ is } \underline{\text{less than}} 2\frac{1}{4}.$$

When you multiply a mixed number by a fraction less than 1,

the product will be **less than** the mixed number.

$$1\frac{1}{4} \times 1\frac{3}{4} \text{ is } \underline{\quad? \quad} 1\frac{1}{4}.$$

Use what you know about the product of two whole numbers greater than 1 to determine the size of the product of two mixed numbers.

$$\text{So, } 1\frac{1}{4} \times 1\frac{3}{4} \text{ is } \underline{\text{greater than}} 1\frac{1}{4} \text{ and } \underline{\text{greater than}} 1\frac{3}{4}.$$

When you multiply two mixed numbers, their product is **greater than** either factor.

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

1. $\frac{3}{5} \times 1\frac{2}{7}$ is _____ $1\frac{2}{7}$.

2. $\frac{6}{6} \times 3\frac{1}{3}$ is _____ $3\frac{1}{3}$.

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

4. $\frac{8}{9} \times 4\frac{3}{4}$ is _____ $4\frac{3}{4}$.

Name _____

Multiply Mixed Numbers

You can use a multiplication square to multiply mixed numbers.

Multiply. $1\frac{2}{7} \times 1\frac{3}{4}$ Write the product in simplest form.

Step 1 Write the mixed numbers outside the square.

\times	1	$\frac{2}{7}$
1		
$\frac{3}{4}$		

Step 2 Multiply the number in each column by the number in each row.

\times	1	$\frac{2}{7}$
1	1×1	$\frac{2}{7} \times 1$
$\frac{3}{4}$	$1 \times \frac{3}{4}$	$\frac{2}{7} \times \frac{3}{4}$

Step 3 Write each product inside the square.

\times	1	$\frac{2}{7}$
1	1	$\frac{2}{7}$
$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{14}$

Step 4 Add the products inside the multiplication square.

$$1 + \frac{2}{7} + \frac{3}{4} + \frac{3}{14}$$

Find the least common denominator.

$$\frac{28}{28} + \frac{8}{28} + \frac{21}{28} + \frac{6}{28} = \frac{63}{28}$$

Simplify.

$$\frac{63}{28} = 2\frac{7}{28}, \text{ or } 2\frac{1}{4}$$

So, $1\frac{2}{7} \times 1\frac{3}{4}$ is $2\frac{1}{4}$.

Find the product. Write the product in simplest form.

1. $2\frac{5}{8} \times 1\frac{1}{7}$

2. $3\frac{1}{2} \times 12$

3. $10\frac{5}{6} \times \frac{3}{5}$

4. $7\frac{7}{10} \times \frac{10}{11}$

Use the Distributive Property to find the product.

5. $12 \times 2\frac{1}{2}$

6. $15 \times 5\frac{1}{3}$

Name _____

Problem Solving • Find Unknown Lengths

Zach built a rectangular deck in his backyard. The area of the deck is 300 square feet. The length of the deck is $1\frac{1}{3}$ times as long as the width. What are the dimensions of the deck?

Read the Problem			
<p>What do I need to find? I need to find <u>the</u> <u>dimensions of the deck</u>.</p>	<p>What information do I need to use? The deck has an area of <u>300</u> square feet, and the length is <u>$1\frac{1}{3}$</u> as long as the width.</p>	<p>How will I use the information? I will <u>guess</u> the length and width of the deck. Then I will <u>check</u> my guess and <u>revise</u> it if it is not correct.</p>	
Solve the Problem			
<p>I can try different values for the length of the deck, each that is $1\frac{1}{3}$ times as long as the width. Then I can multiply the length and width and compare to the correct area.</p>			
Guess	Length (in feet) ($1\frac{1}{3}$ times the width)	Check	Revise
12	$1\frac{1}{3} \times 12 = \underline{16}$	$12 \times 16 = \underline{192}$ too low	Try a <u>longer</u> width.
18	$1\frac{1}{3} \times 18 = \underline{24}$	$18 \times 24 = \underline{432}$ too high	Try a <u>shorter</u> width.
15	$1\frac{1}{3} \times 15 = \underline{20}$	$15 \times 20 = \underline{300}$ correct	
<p>So, the dimensions of the deck are <u>20</u> feet by <u>15</u> feet.</p>			

1. Abigail made a quilt that has an area of 4,800 square inches. The length of the quilt is $1\frac{1}{3}$ times the width of the quilt. What are the dimensions of the quilt?

2. The width of the mirror in Shannon's bathroom is $\frac{4}{9}$ its length. The area of the mirror is 576 square inches. What are the dimensions of the mirror?
