

Multiply a Fraction and a Mixed Number

Watch

1. Convert to improper

2. multiply

3. Convert back to a mixed # and simplify

To multiply a fraction and a mixed number, first write the mixed number as an improper fraction. Remember that when mixed numbers are written as improper fractions, the denominator does not change. Then multiply as with fractions.

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

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

$$= \frac{5}{8}$$

Examples

Tutor

1. Find $\frac{1}{3} \times 1\frac{3}{4}$. Write in simplest form.

Estimate Use compatible numbers. $\frac{1}{2} \times 2 = 1$

$$\frac{1}{3} \times 1\frac{3}{4} = \frac{1}{3} \times \frac{7}{4} \quad \text{Write } 1\frac{3}{4} \text{ as } \frac{7}{4}.$$

$$= \frac{1 \times 7}{3 \times 4} \quad \text{Multiply.}$$

$$= \frac{7}{12} \quad \text{Simplify. Compare to the estimate.}$$

2. Find $5\frac{1}{2} \times \frac{1}{3}$. Write in simplest form.

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

5+2=7, 10+1=11

$$5\frac{1}{2} \times \frac{1}{3} = \frac{11}{2} \times \frac{1}{3} \quad \text{Write } 5\frac{1}{2} \text{ as an improper fraction.}$$

$$= \frac{11 \times 1}{2 \times 3} \quad \text{Multiply.}$$

$$= \frac{11}{6} \text{ or } 1\frac{5}{6} \quad \text{Simplify.}$$

Check for Reasonableness $1\frac{5}{6} \approx 2 \checkmark$

Got it? Do these problems to find out.

a. $\frac{2}{3} \times 2\frac{1}{2}$ *2 \cdot 2 + 1 = 5*

$$\frac{2}{3} \times \frac{5}{2} = \frac{10}{6} = \frac{4}{1} = 1\frac{2}{3}$$

or $\frac{5}{3} = 1\frac{2}{3}$

b. $\frac{3}{8} \times 3\frac{1}{3}$

$$\frac{3}{8} \times \frac{10}{3} = \frac{30}{24} = \frac{5}{4} = 1\frac{1}{4}$$

You can cross cancel
 $1\frac{3}{8} \cdot \frac{10}{3} = \frac{10}{8} = \frac{5}{4} = 1\frac{1}{4}$
 $3 \cdot 3 = 9H = 10$

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

b. $1\frac{1}{4}$

Show your work.

Multiply Mixed Numbers

To multiply two mixed numbers, write each mixed number as an improper fraction. Use the greatest common factor, or GCF, to simplify.

Examples

Tutor

3. Find $1\frac{7}{8} \times 3\frac{1}{3}$. Write in simplest form.

$$\begin{aligned} 1\frac{7}{8} \times 3\frac{1}{3} &= \frac{15}{8} \times \frac{10}{3} \\ &= \frac{15}{8} \times \frac{10}{3} \\ &= \frac{25}{4} \\ &= 6\frac{1}{4} \end{aligned}$$

Write $1\frac{7}{8}$ as $\frac{15}{8}$. Write $3\frac{1}{3}$ as $\frac{10}{3}$.

Divide 15 and 3 by their GCF, 3.
Then divide 10 and 8 by their GCF, 2.

Multiply the numerators and multiply the denominators. They need to reduce.
Simplify.

If you don't cross cancel you would get $\frac{150}{24} \rightarrow$

Tip:
- Cross Cancel
or
- Simplify before converting to a mixed #

$$\frac{75}{12} \rightarrow \frac{25}{4}$$

4. The Hoover Dam contains $4\frac{1}{2}$ million cubic yards of concrete.

The Grand Coulee Dam, in Washington state, contains $2\frac{2}{3}$ times as much concrete. How much concrete does it contain?

Estimate $4 \times 3 = 12$

$$\begin{aligned} 4\frac{1}{2} \times 2\frac{2}{3} &= \frac{9}{2} \times \frac{8}{3} \\ &= \frac{9}{2} \times \frac{8}{3} \\ &= \frac{3}{1} \times \frac{4}{1} \\ &= \frac{12}{1} \text{ or } 12 \end{aligned}$$

Write the mixed numbers as improper fractions.

Divide 9 and 3 by their GCF, 3.
Then divide 8 and 2 by their GCF, 2.

Multiply the numerators and multiply the denominators.
Simplify.

There are 12 million cubic yards of concrete in the Grand Coulee Dam.

Check for Reasonableness $12 = 12$ ✓

Got it? Do this problem to find out.

c. Mr. Wilkins is laying bricks to make a rectangular patio. The area he is covering with bricks is $15\frac{1}{2}$ feet by $9\frac{3}{4}$ feet. What is the area of the patio?

$$\begin{aligned} 15\frac{1}{2} \times 9\frac{3}{4} \\ 15.2 + 1 \quad 9.4 + 3 \\ \frac{31}{2} \cdot \frac{39}{4} \quad \frac{1209}{6} \end{aligned}$$

STOP and Reflect

Is the product of two mixed numbers greater than or less than both the factors? Explain below.

Word Problems "OF" after a fraction means multiply

Show your work.

c. _____

Independent Practice

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Multiply. Write in simplest form. (Examples 1–3)

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

2. $1\frac{7}{8} \times \frac{4}{5} =$ _____

3. $\frac{7}{8} \times 3\frac{1}{4} =$ _____

Show your work. →

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

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

6. $6\frac{2}{3} \times 3\frac{3}{10} =$ _____

- 7** A carp can travel at a speed of $3\frac{7}{10}$ miles per hour. At this rate, how far can a carp travel in $2\frac{1}{2}$ hours? (Example 4)

- 8.** Juliette is making fruit salad. She purchased $9\frac{2}{3}$ ounces each of 6 different fruits. How many ounces of fruit did she purchase? (Example 5)

- 9** A waffle recipe calls for $2\frac{1}{4}$ cups of flour. If Chun wants to make $1\frac{1}{2}$ times the recipe, how much flour does he need? (Example 4)

- 10. PS Model with Mathematics** Use the formula $d = rt$ to find the distance d a long-distance runner can run at a rate r of $9\frac{1}{2}$ miles per hour for time t of $1\frac{3}{4}$ hours.

- 11. STEM** Earth is about $92\frac{9}{10}$ million miles from the Sun. Use the table shown.

- a. How far is Venus from the Sun? _____
- b. How far is Mars from the Sun? _____
- c. How far is Jupiter from the Sun? _____
- d. How far is Saturn from the Sun? _____

Planet	Approximate Number of Times as Far from the Sun as Earth
Venus	$\frac{3}{4}$
Mars	$1\frac{1}{2}$
Jupiter	$5\frac{1}{4}$
Saturn	$9\frac{1}{2}$

