Fractions, Ratios, and Proportions
Work Sheets

The work sheets are grouped according to math skill. Each skill is then arranged in a sequence of work sheets that build from simple to complex. Choose the work sheets that best fit the student’s need and will bring him up to the desired level.

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Subtracting a Mixed Number From a Whole Number

You can not subtract a fraction from nothing.

Cross out 8 and write 7.

You are subtracting fifths, so change the 1 you borrowed to \( \frac{5}{5} \) and write it above the fraction.

Now you can subtract.

Borrow from the whole number before you subtract.

1. a. \( \frac{3}{5} \) b. \( \frac{5}{8} \) c. \( \frac{6}{9} \) d. \( \frac{7}{3} \)

2. a. \( \frac{8}{7} \) b. \( \frac{2}{5} \) c. \( \frac{6}{7} \) d. \( \frac{9}{12} \)

3. a. \( \frac{8}{12} \) b. \( \frac{6}{10} \) c. \( \frac{7}{10} \) d. \( \frac{5}{8} \)
Borrowing to Subtract Fractions

When the top fraction is smaller than the bottom fraction in a subtraction problem, you must borrow.

You cannot subtract \(\frac{4}{5}\) from \(\frac{2}{5}\). Borrow 1 from 5.

Change the 1 to \(\frac{5}{5}\) and add it to \(\frac{2}{5}\).

The 5 becomes a 4 and the \(\frac{2}{5}\) becomes \(\frac{7}{5}\).

Subtract. Borrow as needed. Give answers in simplest form.

\[
\begin{align*}
1. & \quad \text{a. } -3\frac{11}{12} \\
   & \quad \text{b. } -6\frac{7}{8} \\
   & \quad \text{c. } -3\frac{2}{7} \\
   & \quad \text{d. } -3\frac{3}{4}
\end{align*}
\]

\[
\begin{align*}
2. & \quad \text{a. } -2\frac{3}{5} \\
   & \quad \text{b. } -8\frac{3}{8} \\
   & \quad \text{c. } -7\frac{5}{6} \\
   & \quad \text{d. } -6\frac{11}{12}
\end{align*}
\]

\[
\begin{align*}
3. & \quad \text{a. } -4\frac{7}{16} \\
   & \quad \text{b. } -5\frac{3}{4} \\
   & \quad \text{c. } -7\frac{1}{8} \\
   & \quad \text{d. } -1\frac{7}{8}
\end{align*}
\]

\[
\begin{align*}
4. & \quad \text{a. } -6\frac{5}{7} \\
   & \quad \text{b. } -8\frac{7}{16} \\
   & \quad \text{c. } -6\frac{7}{12} \\
   & \quad \text{d. } -\frac{5}{9}
\end{align*}
\]

Note: If student doesn’t know how to simplify assign worksheets 36–38.
Multiplying Mixed Numbers, Whole Numbers, and Fractions With More Than Two Factors

When multiplying mixed numbers, whole numbers, and fractions, the first step is to rewrite the problem, changing mixed and whole numbers to improper fractions. You can cancel any denominator with any numerator. Then multiply all the numerators together and all the denominators together. If the answer is an improper fraction, change it back to a mixed number.

There are no mixed numbers or whole numbers. Pairs that cancel are 22 and 2, and 7 and 7.

\[ \frac{5}{2} \times \frac{7}{15} \times \frac{4}{7} = \frac{1}{6} \]

Change all mixed numbers to improper fractions. Pairs that cancel are 22 and 2, and 7 and 7.

\[ 3 \frac{1}{7} \times \frac{2}{3} \times 3 \frac{1}{2} = \frac{11}{2} \times \frac{2}{3} \times \frac{1}{7} = \frac{22}{3} = 7 \frac{1}{3} \]

Solve. Cancel if possible.

1. a. \( \frac{7}{12} \times 1 \frac{2}{3} \times \frac{6}{7} = \) _____ b. \( 2 \times 2 \frac{1}{2} \times 2 \frac{1}{4} = \) _____ c. \( \frac{1}{2} \times \frac{1}{4} \times \frac{2}{3} = \) _____

2. a. \( 1 \frac{2}{9} \times 2 \frac{1}{2} \times \frac{9}{10} = \) _____ b. \( 2 \frac{1}{4} \times \frac{7}{20} \times 6 \frac{2}{3} = \) _____ c. \( \frac{2}{9} \times \frac{1}{5} \times \frac{5}{8} = \) _____

3. a. \( 16 \times \frac{1}{21} \times 1 \frac{1}{2} = \) _____ b. \( 1 \frac{2}{3} \times 3 \frac{3}{4} \times 2 \frac{2}{3} = \) _____ c. \( \frac{1}{3} \times \frac{3}{4} \times \frac{1}{2} = \) _____

4. a. \( \frac{3}{8} \times 1 \frac{2}{3} \times 3 = \) _____ b. \( 3 \frac{1}{3} \times 1 \frac{2}{5} \times 12 = \) _____ c. \( \frac{2}{3} \times \frac{1}{8} \times \frac{1}{4} = \) _____

Note: If student doesn’t know how to simplify assign worksheets 36–38.
Using Proportions to Convert U.S. Measures

Proportions can be helpful in converting measures. They help us keep track of when we should multiply or divide.

60 feet is how many inches?

First write the conversion ratio. \( \frac{1 \text{ foot}}{12 \text{ inches}} \)

Then write the second ratio, keeping each unit (feet and inches) on the same level as the first ratio. \( \frac{1 \text{ foot}}{12 \text{ inches}} = \frac{60 \text{ feet}}{n \text{ inches}} \)

The second ratio uses \( n \) for inches since we need to find inches.

Solve. \( 12 \times 60 \div 1 = 720. \)

60 feet is 720 inches.

336 hours is how many days?

\( \frac{1 \text{ day}}{24 \text{ hours}} = \frac{n \text{ days}}{336 \text{ hours}} \)

Solve. \( 1 \times 336 \div 24 = 14. \)

336 hours is 14 days.

Often when you need to convert measures, you will know whether to divide or multiply. But if your answer does not seem sensible or if you get confused, setting up a proportion helps you stay on track. Proportions are especially helpful when you do more complicated conversions.

Set up a proportion to find each answer.

1. a. 180 in = _______ yd
   b. 4 yd = _______ ft

   Set up a proportion.

Solve cross products.

2. a. 112 oz = _______ lb
   b. 12 gal = _______ qt

   Set up a proportion.

Solve cross products.