



Let's Operate!
Operations with Fractions

Suggested time: 45 minutes

What's important in this lesson:

It is important for you to recognize the different steps involved in fraction questions where you are adding, subtracting or multiplying questions. You will need to use equivalent fractions to make some of the addition and subtraction questions possible! Work carefully and show neat and complete answers to each problem.

Complete these steps:

1. Read through the Lesson portion of the package independently.
2. Complete the required 'Practice' questions.
3. If you have questions about the examples or the 'Practice' questions seek assistance from the teacher as needed.
4. Use 'Practice' Answer Keys to check your answers as they work through the package. If you are making errors, have your teacher review these questions with you.
5. Complete the Let's Operate Assignment.

Hand-in the following to your teacher:

1. Practice Problems from the Student Handout
2. Let's Operate Assignment

Questions for the teacher:



Let's Operate! Operations with Fractions

For addition and subtraction of fractions, there are 3 rules to remember:

1. The **denominators** (bottoms) must be the same (and they stay the same!)
2. The **numerators** (tops) must be added
3. All answers should be **reduced to lowest terms**

Part A - Same Denominators

Examples

1. $\frac{1}{9} + \frac{2}{9} + \frac{4}{9} = \frac{7}{9}$

2. $\frac{3}{8} + \frac{1}{8} = \frac{4}{8} = \frac{1}{2}$

3. $\frac{11}{12} - \frac{4}{12} = \frac{7}{12}$

4. $\frac{13}{15} - \frac{8}{15} = \frac{5}{15} = \frac{1}{3}$

Remember:

All answers must be reduced to lowest terms!

Part B - When One Denominator is a Factor of the other Denominator

When one of the denominators (bottoms) can be divided evenly by the other, then the smaller one can be changed into an **EQUIVALENT FRACTION**:

Examples

1.

$$\begin{aligned} \frac{1}{4} + \frac{3}{8} &= \frac{1 \times 2}{4 \times 2} + \frac{3}{8} \\ &= \frac{2}{8} + \frac{3}{8} \\ &= \frac{5}{8} \end{aligned}$$

2.

$$\begin{aligned} \frac{5}{18} + \frac{1}{2} &= \frac{5}{18} + \frac{1 \times 9}{2 \times 9} \\ &= \frac{5}{18} + \frac{9}{18} \\ &= \frac{14}{18} \\ &= \frac{7}{9} \end{aligned}$$

3.

$$\begin{aligned} \frac{2}{3} - \frac{1}{6} &= \frac{2 \times ?}{3 \times ?} - \frac{1}{6} \\ &= \frac{4}{6} - \frac{1}{6} \\ &= \frac{3}{6} \\ &= \frac{1}{2} \end{aligned}$$



Part C - When the Denominators are Different

For questions where the denominators are NOT FACTORS of each other, you can use multiplication (twice) to help you

Examples

1.

$$\begin{aligned} \frac{2}{5} + \frac{1}{3} &= \frac{2 \times 3}{5 \times 3} + \frac{1 \times 5}{3 \times 5} \\ &= \frac{6}{15} + \frac{5}{15} \\ &= \frac{11}{15} \end{aligned}$$

Notice that the first fraction was multiplied by 3 (the denominator of the second) and the second fraction was multiplied by 5 (the denominator of the first)!

Now that the denominators are the same, you just add the numerators.

2.

$$\begin{aligned} \frac{2}{3} - \frac{1}{4} &= \frac{2 \times 4}{3 \times 4} - \frac{1 \times 3}{4 \times 3} \\ &= \frac{8}{12} - \frac{3}{12} \\ &= \frac{5}{12} \end{aligned}$$

3. Fill in the missing values

$$\begin{aligned} \frac{4}{5} + \frac{1}{2} &= \frac{4 \times 2}{5 \times 2} + \frac{1 \times 5}{2 \times 5} \\ &= \frac{\quad}{10} + \frac{\quad}{10} \\ &= \frac{\quad}{10} \\ &= \end{aligned}$$

Notice that this is an improper fraction!

Change it to a mixed number



Part D - Multiplying a Fraction by a Whole Number

Example

$$\begin{aligned}
 5 \times \frac{1}{2} &= \frac{5}{1} \times \frac{1}{2} \\
 &= \frac{5}{2} \quad \begin{array}{l} \text{multiply the two tops} \\ \text{multiply the two bottoms} \end{array} \\
 &= 2\frac{1}{2}
 \end{aligned}$$

Notice that the 5 is now $\frac{5}{1}$! All whole numbers can be written as fractions over 1!

Remember to change the answer to a mixed number!

Practice Problems

1. ADD or SUBTRACT the following fractions. Don't forget that all final answers...
- should be reduced to lowest terms
 - should not have any improper fractions (change them to mixed numbers)

a. $\frac{2}{7} + \frac{4}{7} = \underline{\hspace{2cm}}$

e. $\frac{5}{9} - \frac{4}{9} = \underline{\hspace{2cm}}$

b. $\frac{1}{6} + \frac{2}{6} + \frac{4}{6} = \underline{\hspace{2cm}}$
 $\hspace{10em} = \underline{\hspace{2cm}}$

f. $\frac{5}{8} - \frac{3}{8} = \underline{\hspace{2cm}}$
 $\hspace{10em} = \underline{\hspace{2cm}}$

c. $\frac{7}{12} + \frac{3}{12} = \underline{\hspace{2cm}}$
 $\hspace{10em} = \underline{\hspace{2cm}}$

g. $\frac{1}{10} + \frac{1}{5} = \frac{1}{10} + \frac{1 \times \hspace{1cm}}{5 \times \hspace{1cm}}$
 $\hspace{10em} = \underline{\hspace{2cm}}$
 $\hspace{10em} = \underline{\hspace{2cm}}$

d. $\frac{3}{4} + \frac{1}{2} = \underline{\hspace{2cm}}$
 $\hspace{10em} = \underline{\hspace{2cm}}$
 $\hspace{10em} = \underline{\hspace{2cm}}$

h. $\frac{2}{3} - \frac{1}{2} = \underline{\hspace{2cm}}$
 $\hspace{10em} = \underline{\hspace{2cm}}$
 $\hspace{10em} = \underline{\hspace{2cm}}$



2. MULTIPLY

a. $7 \times \frac{2}{3} =$ _____

= _____

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

= _____

3. A recipe requires $\frac{3}{4}$ cup of flour, $\frac{3}{4}$ cup sugar, and $\frac{1}{4}$ cup of water. Find the total of these ingredients.
4. John spends $\frac{5}{8}$ of an hour doing his homework. Steve spends $\frac{1}{4}$ of an hour doing his homework. What fraction of an hour MORE than Steve does John spend doing homework?

*** Check the answers to these questions before moving on!**



Let's Operate Assignment

Remember all final answers...

- should be reduced to lowest terms
- should be changed to mixed numbers

1. Add or Subtract the following:

a. $\frac{1}{8} + \frac{3}{8} + \frac{7}{8} =$

c. $\frac{3}{6} - \frac{1}{6} =$

b. $\frac{4}{15} + \frac{1}{5} =$

d. $\frac{5}{6} - \frac{3}{4} =$

2. An athlete begins a race that is $\frac{9}{10}$ of a kilometer long. She sprints for the first $\frac{3}{10}$ of a kilometer, then jogs for the rest of the race. What fraction of a kilometer did she jog?
3. A bowl contains $\frac{7}{8}$ of a cup of water. If you add a $\frac{1}{2}$ cup of oil to this, then how much liquid will be in the bowl?

Student Evaluation: Unit 1 Lesson 3



4. If you spend $\frac{2}{3}$ of an hour reading a book, and $\frac{1}{4}$ of an hour reading a magazine, then what fraction of an hour have you spent reading altogether?

5. A cake recipe requires $\frac{1}{4}$ cup of brown sugar to make one cake. How much sugar will you need to make 9 cakes?