

# Rational Number Project

<b>Fraction Operations and Initial Decimal Ideas Lesson 8: Overview</b>	<b>Materials</b>
Students have developed a strategy for adding and subtracting fractions using their equivalence ideas in previous lessons. This lesson extends their work to special cases: fractions $> 1$ ; sums $> 1$ ; differences with fractions $> 1$ ; sums of more than two fractions.	<ul style="list-style-type: none"> <li>• Problem Set duplicated for each group and cut into 8 separate problems and put in an envelope.</li> <li>• Student Pages A - D</li> </ul>

Teaching Actions	Comments
<p><b>Warm Up</b></p> <p>Without using your pencil, estimate which expression is greater: <math>\frac{6}{15} + \frac{1}{5}</math> or <math>\frac{7}{8} - \frac{1}{10}</math></p> <p><b>Large Group Introduction</b></p> <ol style="list-style-type: none"> <li>Review main ideas in large group using these problems:           <ul style="list-style-type: none"> <li>• Estimate this sum: <math>\frac{3}{4} + \frac{4}{9} =</math></li> <li>• Find three fractions equal to <math>\frac{4}{5}</math>.</li> <li>• Caylee ran <math>\frac{4}{5}</math> of a mile while Emilio ran <math>\frac{7}{8}</math> of a mile. Who ran the farther? If Emilio ran <math>\frac{6}{8}</math> of a mile, who ran the lesser amount?</li> </ul> </li> <li>Challenge the students with this problem: Evelyn rode her bike <math>3\frac{1}{2}</math> miles on Monday. On Tuesday she rode <math>2\frac{1}{4}</math> miles. On Friday she rode <math>5\frac{3}{8}</math> miles. How far did she ride in all?</li> </ol>	<p>These items review order ideas.</p> <ul style="list-style-type: none"> <li>• When adding <math>\frac{3}{4} + \frac{4}{9}</math>, students compare both fractions to <math>\frac{1}{2}</math>.</li> <li>• When comparing <math>\frac{4}{5}</math> and <math>\frac{7}{8}</math> students rely on the residual strategy.</li> <li>• When students order <math>\frac{4}{5}</math> and <math>\frac{6}{8}</math>, they can use the residual strategy if they reduce <math>\frac{6}{8}</math> to <math>\frac{3}{4}</math>.</li> </ul>

## Teaching Actions

### Small Group/Partner Work

3. Set the stage for this lesson by explaining that each pair of students will receive an envelope with 8 problems. (*Problems from Student Pages A and B*). These problems are a bit more difficult than the ones they have solved before. Explain that they are similar to the one they just solved and if they work together they will be able to solve the problems.
4. As students work on the problems keep track of their different strategies. Identify the strategies you want all the class to learn. (Identify students ahead of time; give them a transparency to record their solution. This way they are ready to share).

### Wrap Up

5. When students are finished bring class together to go over each problem.
6. Summarize the big ideas together that show how the students were able to solve more complex problems using the basic information they had for estimating and adding and subtracting fractions.
7. Reinforce these problems with Student Page C and D which could be a homework assignment or more class work.

### Translations:

- Real life to symbols
- Symbols to symbols
- Symbols to verbal

## Comments

Information on class work problems:

- #1 For fractions greater than one, students should be able to imagine  $\frac{6}{5}$  and see that it would equal one whole circle and  $\frac{1}{5}$  more.
- # 2 Students may solve the clock problem by reducing  $\frac{20}{60}$  to  $\frac{1}{3}$ .
- #3 Students can verbalize the need to work through two steps in a problem based on skills they practiced separately in the past.
- # 5 Students can use their common denominator strategy to add or subtract more than two fractions. Students may add mixed numbers by adding or subtracting the fraction part and then working with the whole number part. (See examples below for the problem

$$3\frac{1}{2} + 2\frac{1}{4} + 5\frac{1}{8}$$

$$3 + 2 + 5 = 10 \text{ miles}$$

$$\frac{1}{4} = \frac{2}{8} \quad \frac{1}{2} = \frac{4}{8} \quad 10 \frac{7}{8} \text{ miles}$$

$$\frac{2}{8} + \frac{4}{8} + \frac{1}{8} = \frac{7}{8}$$

$$3 \frac{14}{8} + 2 \frac{12}{8} + 5 \frac{1}{8}$$

$$3 \frac{4}{8} + 2 \frac{2}{8} + 5 \frac{1}{8} = 10 \frac{7}{8}$$

Without using your pencil,  
estimate which expression is  
greater:

$$\frac{6}{12} + \frac{1}{5} \quad \text{or} \quad \frac{7}{8} - \frac{1}{10}$$

## Problem Solving

(1) Draw a picture to rewrite  $1\frac{3}{4}$  as an improper fraction. Explain what you did.

(2) Chee arrived at the dentist's office at 2:30. He didn't get to see the dentist until 2:45. What fraction of an hour did he wait? Reduce to lowest terms. Explain how you solved this problem.

(3) Brenna is making three different cookie recipes. One recipe asks for  $2\frac{1}{4}$  cups of flour. The second recipe calls for  $2\frac{1}{2}$  cups. The last recipe calls for  $\frac{3}{4}$  cup of flour. How much did she use in all? Explain how you solved this problem. Can you do this mentally without paper and pencil?

(4)

$$15\frac{2}{3} - 12\frac{1}{4} = \text{ Explain your work.}$$

<p>(5) Draw a picture to rewrite <math>\frac{9}{8}</math> as a whole number and a fraction. Explain what you did.</p>	<p>(6) Solve with symbols and show how you can solve with pictures:</p> $\frac{1}{2} + \frac{1}{4} + \frac{1}{6} =$
<p>(7) Mitzy ran <math>3\frac{3}{4}</math> of a mile in the morning. That afternoon she ran another <math>2\frac{2}{3}</math> of a mile. How much further did she run in the morning? Explain how you solved the problem.</p>	<p>(8) The math team celebrated their victory at the national math contest. The principal gave them 2 sheet cakes of the same size for their celebration. One was a chocolate cake and the other one was a carrot cake. They ate <math>\frac{4}{5}</math> of the chocolate cake and <math>\frac{3}{4}</math> of the carrot cake. How much cake did they eat in all? How much cake was left over? Show your work.</p>

## Problem Set

Duplicate these problems for each group. Cut into eight separate problems. Students work on each problem and record their work on their own paper.

**Problem 1:** How is  $\frac{6}{5}$  different from  $\frac{5}{6}$ ? Picture  $\frac{6}{5}$  in your mind. Imagine building that fraction with the circle pieces. Now, rewrite  $\frac{6}{5}$  as a whole number and a fraction. Repeat for  $\frac{4}{3}$ ,  $\frac{9}{5}$ ,  $\frac{8}{4}$ ,  $\frac{6}{4}$ . Explain how you think about changing fractions like these.

**Problem 2:** What fraction of an hour passes from 1:10 AM to 1:30 AM? Is the fraction amount:  $\frac{1}{5}$ ,  $\frac{1}{3}$ ,  $\frac{1}{2}$ ,  $\frac{2}{3}$ , or  $\frac{3}{4}$ ? Explain how you solved this problem.

**Problem 3:** Roger and Joe took a handful of candy from the candy bowl. Roger took  $\frac{1}{3}$  of all the candies. Joe's handful equaled  $\frac{1}{6}$  of all the candy in the bowl. What fraction of the candy is left?

**Problem 4:** Show your work

$$\frac{4}{5} - \frac{1}{3} =$$

$$\frac{1}{3} + \frac{1}{4} + \frac{2}{6} =$$

**Problem 5:** Erin rode her bike  $3\frac{1}{2}$  miles on Monday. She rode her bike  $2\frac{3}{4}$  miles on Wednesday and  $5\frac{1}{8}$  miles on Saturday. How far did she ride her bike in all three days? Show your work

**Problem 6:** Marcus is  $67\frac{3}{8}$  inches tall. Trina is  $61\frac{1}{4}$  inches tall. How much taller is Marcus? Show your work.

**Problem 7:** Carlos lives  $\frac{2}{3}$  mile from school. After riding about  $\frac{1}{8}$  mile on his bike, the bike broke down. Carlos walked the rest of the way to school. Estimate: Did Carlos walk more or less than  $\frac{1}{2}$  mile? Explain without finding the exact answer.

**Problem 8:** Addis lives  $3\frac{4}{5}$  miles from school. Her bike broke down along the way. She had to walk  $2\frac{1}{3}$  miles to school after the bike broke down. How far did she ride her bike?

## Post Lesson Reflection

Lesson \_\_\_\_\_

1) Number of class periods allocated to this lesson: \_\_\_\_\_

2) Student Pages used: \_\_\_\_\_

3) Adaptations made to lesson: (For example: added extra examples, eliminated certain problems, changed fractions used)

4) Adaptations made on Student Pages:

5) To improve the lesson I suggest: