

Rational Number Project

Fraction Operations and Initial Decimal Ideas Lesson 7: Overview	Materials <ul style="list-style-type: none">• Calculators for students• Transparencies 1 and 2• Student Pages A and B
Students solve story problems involving addition and subtraction. The subtraction stories go beyond the take away model used in lesson 6.	

Teaching Actions

Warm Up

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

For each problem estimate to determine if the answer would be > 1 or < 1 .

Find the exact answers to each problem.

Large Group Introduction

1. Explain that today they will continue to solve fraction addition and subtraction problems using their common denominator approach. All problems will be story problems and students need to determine if they should add or subtract to solve the problem.
2. Show the four problems to the students involving whole numbers. Cover up the side with the fractions. Ask students to use their calculators to solve and to keep track whether they added or subtracted the numbers in the problems.
3. Ask students to explain why they added or subtracted. Pay particular attention to why they subtracted in problem 1 (compare) and problem 4 (how many more needed).
4. Show the problems with fractions. Ask: Compare each pair of problems. How are they alike? Different? Does changing the numbers to fractions change the operation?

Comments

Our previous work has shown that students had more difficulty with subtraction than addition even after they could solve addition problems by finding common denominators. Part of the problem was the difficulty they had in identifying a story problem as subtraction.

In this lesson we go beyond the take away model to include other contexts for subtraction.

The reason we are asking students to use a calculator is to focus on the operation between the numbers as opposed to doing the arithmetic.

Students may find common denominators in several ways:

- If the denominators are familiar they use simple recall based on previous experience. For

Teaching Actions

5. Ask students to solve each problem using their common denominator strategy. Share answers.

Small Group/Partner Work

6. Students work on Student Page A. They can use a calculator if they are dealing with whole numbers; but they are to use a common denominator approach with the fractions.

Comments

example, $\frac{1}{3} + \frac{1}{2}$. This problem is so familiar students just know 6ths is the common denominator;

- Students will just multiply denominators and use this product as the common denominator;
- Students will create lists of equivalent fractions

To find equivalent fractions with same denominators we found some students constructed this strategy based on the unit fraction:

$\frac{3}{4} = \frac{\quad}{12}$. They know $\frac{1}{4} = \frac{3}{12}$ so $\frac{3}{4}$ would be three times as many twelfths: $\frac{9}{12}$

Problem 6 on Student Page A involves adding two fractions whose sum >1 . This is the first time students encounter this. Watch how they solve the problem and select students to share their strategies.

Here is an example of a student estimating in subtraction who was able to coordinate what he knew about the relative size of the fractions in the problem and what happens when you operate on them. This is an indication for fraction number sense:

$1\frac{3}{5} - \frac{3}{8}$ You are going to have at least 1 left over because it is not $1\frac{3}{5} - 1\frac{3}{8}$. So then $\frac{3}{5}$ is more than $\frac{1}{2}$ and $\frac{3}{8}$ is less so if you took those two away I think you would be between 1 and $1\frac{1}{2}$.

Teaching Actions

Comments

Wrap Up

7. Go over the fraction problems. Ask students if the whole number problem helped them decide if the fraction problem was addition or subtraction.
8. Estimation should be embedded in this sharing too. Consider the following example;

$$67\frac{5}{6} - 65\frac{3}{4}$$

- Based on the whole numbers only, the answer is about ____
- Is the answer >2 or <2 ?
- What do you know about $\frac{5}{6}$ and $\frac{3}{4}$?
- Which fraction is bigger? How do you know?

Translations:

- Real life to symbols to verbal

<p>Christina is 162 cm tall.</p> <p>Leah is 156 cm tall.</p> <p>How much taller is Christina?</p>	<p>Christina is $63\frac{5}{8}$ in. tall.</p> <p>Leah is $61\frac{1}{2}$ in. tall.</p> <p>How much taller is Christina?</p>
<p>The distance from Los Angeles to New York City is about 2451 miles. After driving 1135 miles, how many more miles do you have to drive?</p>	<p>The race is $5\frac{1}{2}$ miles long. After running $2\frac{3}{8}$ miles, how many more miles do you have to run to finish the race?</p>

On a long distance trip you drove 345 miles in one day and 567 miles the next day. How many miles did you drive in two days?

You have taken up jogging. On the first day you ran $2\frac{2}{5}$ miles. On the next day you ran $1\frac{1}{3}$ miles. How far did you run in two days?

You drove 375 miles in one day on your way to NYC. NYC is 1028 miles away. How much farther do you have to drive?

India ran $3\frac{1}{4}$ miles so far in the race. The race is $5\frac{5}{8}$ miles long. How much farther does she have to run?

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

For each problem estimate to determine if the answer to the above problem be >1 or <1 .

Find the exact answers to the above problems.

First determine if you need to add or subtract the numbers in the problem. Use a calculator if the numbers are whole numbers. Use a common denominator approach if the numbers are fractions. Record your work on the student record page.

<p>(1) Hamdi lives 452 miles from her grand- parents. She lives 135 miles from her cousins. How much further away are her grandparents than her cousins?</p> <p>Is this addition or subtraction?</p>	<p>(2) Paola is $65\frac{3}{4}$ inches tall. Ty is $67\frac{5}{6}$ inches tall. How much taller is Ty than Paola?</p> <p>Is this addition or subtraction?</p>
<p>(3) You have \$3456 saved to buy a car. The used car you want costs \$6785. How much more money do you need to save?</p> <p>Is this addition or subtraction?</p>	<p>(4) You live about $15\frac{3}{4}$ miles from school. You rode your bike $9\frac{3}{8}$ miles. How many more miles do you have to ride to get to school?</p> <p>Is this addition or subtraction?</p>
<p>(5) You are driving to Los Angeles from Minneapolis. The distance is 2436 km. On the first day you drove 456 km. On the second day you drove 557 km. How much further do you have to go?</p> <p>Is this addition or subtraction?</p>	<p>(6) You are riding your bike in a 3-day bike- a-thon. The total distance is $26\frac{1}{2}$ miles. On the first day your rode $8\frac{6}{8}$ miles; On the second day you rode $9\frac{1}{2}$ miles. How far did you ride on the third day to cover all $26\frac{1}{2}$ miles.</p> <p>Is this addition or subtraction?</p>
<p>(7) You have \$1358 in the bank. You spend \$398 on a plane ticket to California. How much money do you have left in the bank?</p> <p>Is this addition or subtraction?</p>	<p>(8) Hamdi lives $2\frac{4}{9}$ miles from school. After going about $\frac{1}{4}$ of a mile, her bike broke down and she walked the rest of the way. How far did Hamdi walk?</p> <p>Is this addition or subtraction?</p>

Name _____

Recording Sheet

(1)	(2)
(3)	(4)
(5)	(6)
(7)	(8)

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: