Dividing Rational Numbers

Lesson Overview

In this lesson students use the chain notes strategy to support student learning of division of rational numbers. Student groups are provided mathematical tasks, some which have been worked correctly and some which have been worked incorrectly. Students take turns commenting on one step of the solved task to determine where the mistake might be, if one exists.

Standards Addressed

7.NS.2 Apply and extend previous understandings of multiplication and division of fractions to multiply and divide rational numbers.

Disciplinary Literacy Best Practices

Chain Notes
Exit Ticket
Elbow Partners
Popsicle Sticks
Thumbs Up
Making Thinking Visible (MTV)

Lesson Plan

Time Required: One or Two 50-minute Class Periods

Disciplinary Vocabulary: multiplicative inverse, reciprocal

Materials Needed:

- Chain Notes Task Cards
- Exit Ticket

Assessment:

Completed Chain Notes with comments from student groups, Exit Ticket

Engage

- Students will complete the following bell-ringer tasks as class begins:
  - Solve: $\frac{1}{2} \div \frac{1}{4} =$
  - Solve: $2\frac{1}{3} \div 4\frac{1}{8}$
  - Consider the division rules for positive and negative numbers. What do you remember about dividing positive and negative numbers?
- The teacher will use the bell-ringer tasks to review division of fractions, division of mixed numbers, and division of integers.
- Student dialogue prompt: Defend or dispute the following statement—"When you divide fractions that have positive or negative signs, you do **NOT** follow the same sign division rules that you follow with integers."

Explore

- Teacher will provide examples of multiplication of rational numbers and lead students in discussion about the connection of their previous knowledge of multiplying fractions and of dividing integers to dividing positive and negative fractions (rational numbers).
- Students will be provided opportunities with guided practice and independent practice on dividing rational numbers.

Explain

- Students will be divided into groups of three or four to practice dividing rational numbers using the Chain Notes strategy.
- Each student will be provided one of the four worked example problems (see last two pages of lesson plan.)
- Each student should make one comment on the worked example. Comments may be related to correct work, or corrections to incorrect work. Correct work should include an explanation of how the student knows the work is correct.
- After one minute of reviewing the problem, each student will pass the paper to another group member.
- The process of reviewing and making corrections is repeated until every group member has commented on every task provided to the group.

Exit Ticket: Reflections on the Chain Notes Strategy

1. Did you find using the Chain Notes strategy helpful?
2. If yes, explain why it was helpful with learning how to divide positive and negative fractions.
3. If no, explain why it was not helpful with learning how to divide positive and negative fractions.

Teacher Biographical Information

This lesson was taught to an advanced group of seventh grade students, but it can be adjusted to any higher elementary, any middle school, or high school student in any math class. The chain note strategy can be adjusted and used in any level of class in any subject area. The chain note strategy helps all students to be successful and it helps struggling students by giving them the opportunity to see what his or her classmates are thinking.

Lesson Author:

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Problem 1	**Problem 2**
$\frac{2}{3} \div \left(-\frac{3}{5}\right) =$	$3\frac{1}{4} \div 5\frac{1}{3} =$
$\frac{3}{2} \cdot \left(\frac{3}{5}\right) =$	$\frac{7}{4} \div \left(\frac{16}{3}\right) =$
$\frac{9}{10}$	$\frac{7}{4} \cdot \frac{16}{3} =$
	$-\frac{70}{12}$

Problem 3

$8\frac{1}{2} \div \left(-1\frac{5}{6}\right) =$

$\frac{17}{2} \div \left(-\frac{11}{6}\right) =$

$\frac{17}{2} \cdot \left(-\frac{6}{11}\right) =$

$-\frac{102}{22} =$

$-\frac{102}{22} \div \frac{2}{2} = -\frac{51}{11} =$

$-51 \div 11 =$

$-4\frac{7}{11}$

Problem 4

$-\frac{8}{9} \div \left(-\frac{4}{7}\right) =$

$-\frac{8}{9} \cdot \left(-\frac{7}{4}\right) =$

$\frac{56}{36} =$

$\frac{56}{36} \div \frac{4}{4} =$

$\frac{14}{9} =$

$1\frac{5}{9}$