

Fraction Fix

Student Workbook | Lessons 51-54

Meaning first. Efficient procedures from understanding. Durable fluency through retrieval.

Lesson progression

51 Operations With Signed Fractions

52 Fractions in Equations

53 Complex Fractions, Slope, and Formulas

54 Fraction Fluency Performance Task

Working habits

Estimate before computing. Name the unit. Connect a representation to the equation. Check reasonableness.

Name: _____

Lesson 51 | Operations With Signed Fractions

1 of 3

Today's Mathematics Extend rational-number operations using properties and number-line meaning.

Essential Question How can sign and magnitude be analyzed before exact computation?

Part I | Get Started

1. Predict the sign of $-5/6 + 3/4$.

2. Find a common denominator for sixths and fourths.

Notice and Predict

3. Which addend has greater absolute value?

4. Predict whether the result is near zero or near -1.

Sketch, model, or estimate

Lesson 51 | Operations With Signed Fractions

2 of 3

Part II | Investigate

Determine sign, estimate magnitude, then compute mixed signed expressions.

Representation workspace | Number line and equations



5. Model $-5/6 + 3/4$ as movement on the line.

6. Compute $-2/3 - 5/8$.

7. Explain how absolute values help determine the sign.

Conjecture, connection, or revised model

Part III | Make Sense and Practice

WORKED CONNECTION

Example: $-5/6 + 3/4 = -10/12 + 9/12 = -1/12$. The negative addend has slightly greater magnitude.

8. Compute $-7/10 + 1/4$.

9. Compute $5/6 - (-2/9)$.

10. Compute $(-3/5)(10/9)$.

11. Compute $(-7/8)$ divided by $(1/4)$.

Error Analysis

12. A student applies “two negatives make a positive” to $-2/3 - 1/2$. Explain why subtraction is not multiplication.

Exit Ticket

- A. Compute $-5/6 + 3/4$.

- B. Explain the sign before presenting the exact value.

Today's Mathematics Solve equations containing fractional coefficients and constants with structural reasoning.

Essential Question When is inverse-operation reasoning preferable to clearing denominators?

Part I | Get Started

1. Solve $x/3=5$.

2. Find the LCD of 4, 2, and 8.

Notice and Predict

3. Estimate x in $(3/4)x-1/2=5/8$.

4. Which first step preserves the balance?

Sketch, model, or estimate

Part II | Investigate

Solve equations by inverse operations and by clearing denominators, then compare methods.

Representation workspace | Balance model and equations

5. Solve by inverse operations.

6. Solve again after multiplying every term by 8.

7. Check the result in the original equation.

Conjecture, connection, or revised model

Part III | Make Sense and Practice

WORKED CONNECTION

Example: $(\frac{3}{4})x - \frac{1}{2} = \frac{5}{8} \rightarrow (\frac{3}{4})x = \frac{9}{8} \rightarrow x = (\frac{9}{8})(\frac{4}{3}) = \frac{3}{2}$.

8. Solve $(\frac{2}{5})x = \frac{3}{4}$.

9. Solve $x/6 + 1/3 = 5/6$.

10. Solve $(\frac{5}{8})x - \frac{3}{4} = \frac{1}{2}$.

11. Explain why an LCD can reduce fraction complexity.

Error Analysis

12. A student multiplies only the fractional terms by 8 and leaves a whole-number term unchanged. Explain why every term must scale.

Exit Ticket

A. Solve $(\frac{3}{4})x - \frac{1}{2} = \frac{5}{8}$.

B. Check the solution in the original equation.

Today's Mathematics Apply fraction fluency in algebraic expressions and rates of change.

Essential Question How does fraction structure support multi-step algebra?

Part I | Get Started

1. Simplify $(1/2)/(3/4)$.

2. State the slope formula.

Notice and Predict

3. Estimate the slope from $(1/2, 1/4)$ to $(3/2, 5/4)$.

4. Identify the horizontal and vertical changes.

Sketch, model, or estimate

Part II | Investigate

Rotate through complex-fraction simplification, rational-coordinate slope, and formula substitution.

Representation workspace | Coordinate plane and equations

5. Compute the exact slope.

6. Simplify $(\frac{2}{3} + \frac{1}{6}) / (\frac{5}{4})$.

7. Substitute $r = \frac{3}{2}$ into $C = 2\pi r$, leaving π exact.

Conjecture, connection, or revised model

Part III | Make Sense and Practice

WORKED CONNECTION

Example: $\text{slope} = (5/4 - 1/4) / (3/2 - 1/2) = 1/1 = 1$. Group each difference before dividing.

8. Simplify $(3/5) / (9/10)$.

9. Find slope through $(-1/2, 3/4)$ and $(1, -3/4)$.

10. Evaluate $d = rt$ for $r = 2 \frac{1}{2}$ and $t = 3/4$.

11. Explain why complex fraction bars require careful grouping.

Error Analysis

12. A student finds slope by dividing x-change by y-change. Use units and rise-over-run to repair the formula.

Exit Ticket

- A. Find a slope through two rational-coordinate points and simplify.

- B. Describe the magnitude check used.

Today's Mathematics Demonstrate durable understanding across magnitude, representation, computation, and transfer.

Essential Question Can fraction knowledge be used accurately, efficiently, flexibly, and independently?

Part I | Get Started

1. Place $7/6$ and $5/8$ approximately on a number line.

2. Explain one equivalence family from memory.

Notice and Predict

3. Choose one representation that best shows magnitude.

4. Set a goal: accuracy, explanation, efficiency, or transfer.

Sketch, model, or estimate

Part II | Investigate

Complete mixed tasks, explain strategy choices, correct a misconception, and solve a novel application.

Representation workspace | Student-selected representations

5. Compare $\frac{11}{15}$ and $\frac{3}{4}$ without a calculator.

6. Compute $2\frac{1}{3} - \frac{5}{8}$ and check reasonableness.

7. Solve a context requiring fraction division and label units.

Conjecture, connection, or revised model

Part III | Make Sense and Practice

WORKED CONNECTION

Performance evidence includes four dimensions: accuracy, magnitude, representation, and transfer. No single dimension is sufficient.

8. Compute $\frac{5}{6} + \frac{7}{10}$.

9. Compute $\frac{3}{4} \times 2\frac{2}{3}$.

10. Solve $(\frac{2}{3})x + \frac{1}{4} = \frac{5}{4}$.

11. Convert $\frac{7}{16}$ to decimal and percent.

Error Analysis

12. Analyze: “ $\frac{3}{5} + \frac{1}{4} = \frac{4}{9}$, and $\frac{4}{9}$ is reasonable because 4 and 9 are larger.” Correct both the procedure and magnitude claim.

Exit Ticket

- A. Choose one response that best demonstrates fluency and explain why.

- B. Use the rubric to mark Secure, Practice, or Repair for each dimension.
