

Fraction Fix

Student Workbook | Lessons 41-45

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

Lesson progression

41 **Fraction Divided by Fraction**

42 **Why Multiply by the Reciprocal**

43 **Tenths, Hundredths, and Decimal Fractions**

44 **Fraction to Decimal**

45 **Percent as a Rate per Hundred**

Working habits

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

Name: _____

Lesson 41 | Fraction Divided by Fraction

1 of 3

Today's Mathematics Use common units to measure one fractional quantity with another.

Essential Question How many divisor-sized groups fit in the dividend?

Part I | Get Started

1. Rename $\frac{2}{3}$ and $\frac{1}{4}$ in twelfths.

2. Estimate whether $\frac{2}{3}$ divided by $\frac{1}{4}$ is above or below 2.

Notice and Predict

3. How many groups of $\frac{3}{12}$ fit in $\frac{8}{12}$?

4. What does the remaining $\frac{2}{12}$ represent?

Sketch, model, or estimate

Lesson 41 | Fraction Divided by Fraction

2 of 3

Part II | Investigate

Rename $\frac{2}{3}$ and $\frac{1}{4}$ in twelfths, then count how many quarter-sized groups fit.

Representation workspace | Common-unit strips and number line



5. Model $\frac{2}{3}$ divided by $\frac{1}{4}$ with common units.

6. Model $\frac{3}{4}$ divided by $\frac{2}{5}$ in twentieths.

7. Explain the fractional part of each quotient.

Conjecture, connection, or revised model

Part III | Make Sense and Practice

WORKED CONNECTION

Example: $\frac{2}{3}$ divided by $\frac{1}{4} = \frac{8}{12}$ divided by $\frac{3}{12} = \frac{8}{3} = 2 \frac{2}{3}$ groups.

8. Compute $\frac{5}{6}$ divided by $\frac{1}{3}$.

9. Compute $\frac{7}{8}$ divided by $\frac{1}{4}$.

10. Compute $\frac{3}{5}$ divided by $\frac{9}{10}$.

11. A $\frac{3}{4}$ -yard ribbon is cut into $\frac{1}{8}$ -yard pieces. How many pieces?

Error Analysis

12. A student counts only two complete quarter-groups in $\frac{2}{3}$ and reports 2. Explain the missing partial group.

Exit Ticket

- A. Solve $\frac{3}{4}$ divided by $\frac{2}{5}$ with a common-unit explanation.

- B. Estimate first and interpret the quotient.

Lesson 42 | Why Multiply by the Reciprocal

1 of 3

Today's Mathematics Derive the general division procedure from multiplication and missing-factor reasoning.

Essential Question Why does multiplying by the reciprocal solve a division problem?

Part I | Get Started

1. Write the inverse multiplication equation for $\frac{3}{4}$ divided by $\frac{2}{5}$.

2. Find the reciprocal of $\frac{7}{9}$.

Notice and Predict

3. What number multiplied by $\frac{2}{5}$ equals $\frac{3}{4}$?

4. How can multiplying by $\frac{5}{2}$ isolate the missing factor?

Sketch, model, or estimate

Part II | Investigate

Transform a/b divided by c/d by scaling both quantities with d/c and explain why the quotient is unchanged.

Representation workspace | Equations and measurement model

5. Derive $3/4$ divided by $2/5$ from $x(2/5)=3/4$.

6. Scale both dividend and divisor by $5/2$.

7. Verify the quotient by multiplication.

Conjecture, connection, or revised model

Part III | Make Sense and Practice

WORKED CONNECTION

Example: a/b divided by c/d asks for $x(c/d)=a/b$; multiplying both sides by d/c gives $x=(a/b)(d/c)$.

8. Compute $5/6$ divided by $3/8$.

9. Compute $7/10$ divided by $14/15$.

10. Compute $2\frac{1}{4}$ divided by $3/5$.

11. Explain why only the divisor is reciprocated.

Error Analysis

12. A student uses keep-change-flip correctly but cannot estimate $1/3$ divided by $5/6$. Rebuild the reasoning before calculating.

Exit Ticket

- A. Compute $5/6$ divided by $3/8$.

- B. Verify the quotient using multiplication.

Today's Mathematics Connect base-ten fractions to decimal place value.

Essential Question How do tenths and hundredths connect fraction names to decimal notation?

Part I | Get Started

1. Write $\frac{3}{10}$ as hundredths.

2. Write $\frac{37}{100}$ as a decimal.

Notice and Predict

3. Compare 0.4 and 0.37 before using a rule.

4. Which fraction names make the comparison visible?

Sketch, model, or estimate

Lesson 43 | Tenths, Hundredths, and Decimal Fractions

2 of 3

Part II | Investigate

Build equivalent tenths and hundredths and place both forms on one number line.

Representation workspace | Hundred grid and number line



5. Shade $40/100$ and $37/100$ on grids.

6. Place 0.4 and 0.37 on the same line.

7. Explain the value of a zero in 0.40.

Conjecture, connection, or revised model

Part III | Make Sense and Practice

WORKED CONNECTION

Example: $0.4 = \frac{4}{10} = \frac{40}{100}$; because $\frac{40}{100} > \frac{37}{100}$, $0.4 > 0.37$.

8. Write 0.63 as a fraction and simplify.

9. Write $\frac{7}{10}$ as a decimal.

10. Compare 0.08 and 0.8.

11. Order 0.5, $\frac{47}{100}$, and $\frac{6}{10}$.

Error Analysis

12. A student says $0.37 > 0.4$ because $37 > 4$. Correct the place-value comparison.

Exit Ticket

- A. Compare 0.4 and 0.37 using fractions.

- B. Explain what the hundredths show.

Today's Mathematics Convert fractions by division and predict terminating behavior in common cases.

Essential Question How does the fraction bar become a decimal representation?

Part I | Get Started

1. Write $\frac{3}{4}$ with denominator 100.

2. Interpret $\frac{5}{8}$ as a division expression.

Notice and Predict

3. Predict whether $\frac{3}{8}$ is between 0.3 and 0.4.

4. Which method could produce an exact decimal?

Sketch, model, or estimate

Part II | Investigate

Interpret numerator divided by denominator and compare equivalent-denominator and long-division methods.

Representation workspace | Division and number line



5. Convert $\frac{3}{8}$ by division.

6. Convert $\frac{7}{20}$ using an equivalent denominator.

7. Compare the methods and identify when each is efficient.

Conjecture, connection, or revised model

Part III | Make Sense and Practice

WORKED CONNECTION

Example: $\frac{3}{8} = 3 \text{ divided by } 8 = 0.375$. The decimal lies between 0.3 and 0.4 as predicted.

8. Convert $\frac{5}{16}$.

9. Convert $\frac{11}{25}$.

10. Write $\frac{2}{3}$ as a repeating decimal.

11. Explain why denominators with only factors 2 and 5 terminate.

Error Analysis

12. A student stops 1 divided by 3 at 0.33 and calls it exact. Explain the difference between 0.33 and 0.333....

Exit Ticket

- A. Convert $\frac{3}{8}$.

- B. Explain the method and check the magnitude.

Today's Mathematics Interpret percent as a fraction with denominator 100 and as a multiplicative rate.

Essential Question How does “per hundred” connect fractions, decimals, and percents?

Part I | Get Started

1. Write 35% as a fraction and decimal.

2. Express $\frac{3}{4}$ as a percent.

Notice and Predict

3. What does 125% mean on a 0-to-2 number line?

4. Predict 20% of 60.

Sketch, model, or estimate

Lesson 45 | Percent as a Rate per Hundred

2 of 3

Part II | Investigate

Represent discounts and survey results using grids, fractions, decimals, and percents.

Representation workspace | Hundred grid and double number line



5. Shade 35% of a hundred grid.

6. Build a double number line connecting 0%, 50%, 100%, and 150%.

7. Explain percent as a multiplicative rate.

Conjecture, connection, or revised model

Part III | Make Sense and Practice

WORKED CONNECTION

Example: $7/20 = 35/100 = 0.35 = 35\%$. The four forms name the same value.

8. Express $9/25$ as a percent.

9. Find 15% of 80.

10. A price decreases 25% from \$60. Find the discount.

11. Interpret 140% of a quantity.

Error Analysis

12. A student says 120% is impossible because a whole has only 100 parts. Explain the difference between a rate and one whole.

Exit Ticket

- A. Express $7/20$ as a decimal and percent.

- B. Explain the denominator-100 connection.
