

Team Champions:

Math 7-8 Packet

Module 3

Math Teacher:
McKemy

Student Name: _____

Period: _____

Are

Ready?

Complete these exercises to review skills you will need for this module.



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Multiply Fractions

EXAMPLE $\frac{3}{8} \times \frac{4}{9}$ $\frac{3}{8} \times \frac{4}{9} = \frac{\overset{1}{\cancel{3}}}{8} \times \frac{\overset{1}{\cancel{4}}}{9}$
 $= \frac{1}{8} \times \frac{1}{9}$
 $= \frac{1}{72}$

Divide by the common factors.

Simplify.

Multiply. Write the product in simplest form.

1. $\frac{9}{14} \times \frac{7}{6}$ _____ 2. $\frac{3}{5} \times \frac{4}{7}$ _____ 3. $\frac{11}{8} \times \frac{10}{33}$ _____ 4. $\frac{4}{9} \times 3$ _____

Operations with Fractions

EXAMPLE $\frac{2}{5} \div \frac{7}{10} = \frac{2}{5} \times \frac{10}{7}$ Multiply by the reciprocal of the divisor.
 $= \frac{2}{\cancel{5}} \times \frac{\overset{2}{\cancel{10}}}{7}$ Divide by the common factors.
 $= \frac{4}{7}$ Simplify.

Divide.

5. $\frac{1}{2} \div \frac{1}{4}$ _____ 6. $\frac{3}{8} \div \frac{13}{16}$ _____ 7. $\frac{2}{5} \div \frac{14}{15}$ _____ 8. $\frac{4}{9} \div \frac{16}{27}$ _____
9. $\frac{3}{5} \div \frac{5}{6}$ _____ 10. $\frac{1}{4} \div \frac{23}{24}$ _____ 11. $6 \div \frac{3}{5}$ _____ 12. $\frac{4}{5} \div 10$ _____

Order of Operations

EXAMPLE $50 - 3(3 + 1)^2$ To evaluate, first operate within parentheses.
 $50 - 3(4)^2$ Next simplify exponents.
 $50 - 3(16)$ Then multiply and divide from left to right.
 $50 - 48$ Finally add and subtract from left to right.
2

Evaluate each expression.

13. $21 - 6 \div 3$ _____ 14. $18 + (7 - 4) \times 3$ _____ 15. $5 + (8 - 3)^2$ _____
16. $9 + 18 \div 3 + 10$ _____ 17. $60 - (3 - 1)^4 \times 3$ _____ 18. $10 - 16 \div 4 \times 2 + 6$ _____

LESSON

3-1

Rational Numbers and Decimals**Reteach**

A teacher overheard two students talking about how to write a mixed number as a decimal.

Student 1: I know that $\frac{1}{2}$ is always 0.5, so $6\frac{1}{2}$ is 6.5 and $11\frac{1}{2}$ is 11.5.

I can rewrite any mixed number if the fraction part is $\frac{1}{2}$.

Student 2: You just gave me an idea to separate the whole number part and the fraction part. For $5\frac{1}{3}$, the fraction part is

$\frac{1}{3} = 0.333\dots$ or $0.\bar{3}$, so $5\frac{1}{3}$ is $5.333\dots$ or $5.\bar{3}$.

I can always find a decimal for the fraction part, and then write the decimal next to the whole number part.

The teacher asked the two students to share their ideas with the class.

For each mixed number, find the decimal for the fraction part. Then write the mixed number as a decimal.

1. $7\frac{3}{4}$

2. $11\frac{5}{6}$

3. $12\frac{3}{10}$

4. $8\frac{5}{18}$

For each mixed number, use two methods to write it as a decimal. Do you get the same result using each method?

5. $9\frac{2}{9}$

6. $21\frac{5}{8}$

LESSON
3-1

Rational Numbers and Decimals

Practice and Problem Solving: D

Write each rational number as a repeating decimal or a terminating decimal. Then tell whether the decimal is terminating or repeating. The first two are done for you.

1. $\frac{13}{20}$ **0.65, terminating** _____

$$\begin{array}{r} 0.65 \\ 20 \overline{)13.00} \\ \underline{120} \\ 100 \\ \underline{100} \\ 0 \end{array}$$

2. $4\frac{2}{3}$ _____ **$4.\overline{6}$, repeating**

$$4\frac{2}{3} = \frac{12}{3} + \frac{2}{3} = \frac{14}{3}$$

$$\begin{array}{r} 4.666 \\ 3 \overline{)14.000} \\ \underline{12} \\ 20 \\ \underline{18} \\ 20 \\ \underline{18} \\ 20 \end{array}$$

3. $\frac{5}{9}$ _____

4. $3\frac{5}{6}$ _____

5. $8\frac{3}{4}$ _____

6. $10\frac{5}{8}$ _____

The decimal for $\frac{5}{16}$ is 0.3125. Use that value to write each decimal.

7. $1\frac{5}{16}$

8. $7\frac{5}{16}$

9. $26\frac{5}{16}$

The decimal for $\frac{4}{15}$ is 0.266... or $0.2\overline{6}$. Use that value to write each decimal.

10. $1\frac{4}{15}$

11. $17\frac{4}{15}$

12. $23\frac{4}{15}$

LESSON
3-1

Rational Numbers and Decimals

Practice and Problem Solving: C

Use the table to answer problems 1 to 4.
The table lists the commuting times for 5 people. Write each ratio in the form $\frac{a}{b}$, and then as a decimal. Tell whether each decimal is a terminating or a repeating decimal.

1. Beau's time to the sum of Charra's and DeLee's times

2. The product of DeLee's time and Beau's time to Adelle's time

3. Write two or three rational numbers with Emmet's time in each denominator. Is the rational number always a terminating decimal? Justify your answer.

4. Use Adelle's time as the denominator of rational numbers. Find a numerator that results in a terminating decimal and find a numerator that results in a repeating decimal. Explain how to find numerators for each type of rational number.

5. Is $\frac{1.5}{7.5}$ a rational number? If not, explain why. If so, explain why and write it as a decimal.

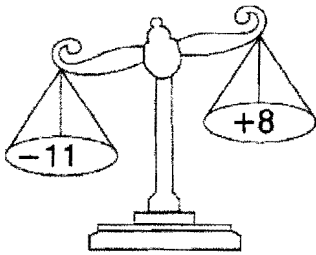
Person	Commuting Time (min.)
Adelle	15
Beau	25
Charra	10
DeLee	8
Emmet	20

LESSON
3-2

Adding Rational Numbers

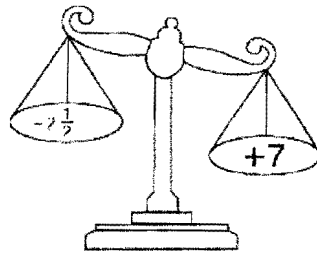
Reteach

This balance scale “weighs” positive and negative numbers. Negative numbers go on the left of the balance. Positive numbers go on the right.



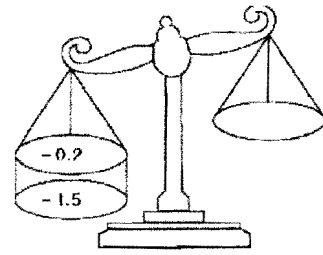
The scale will tip to the left side because the sum of -11 and $+8$ is negative.

$$-11 + 8 = -3$$



The scale will tip to the right side because the sum of $-2\frac{1}{2}$ and $+7$ is positive.

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



Both -0.2 and -1.5 go on the left side. The scale will tip to the left side because the sum of -0.2 and -1.5 is negative.

$$-0.2 + (-1.5) = -1.7$$

Find $3 + (-9)$.

Should you add or subtract?

Will the sum be positive or negative?

$$3 + (-9) = -6$$

$$|9| - |3|$$

the sign of the integer with the greatest absolute value

Find each sum.

- | | | |
|--|--|---|
| 1. $-2 + 4 =$ _____ | 2. $3 + (-8) =$ _____ | 3. $-5 + (-2) =$ _____ |
| 4. $2.4 + (-1.8) =$ _____ | 5. $1.1 + 3.6 =$ _____ | 6. $-2.1 + (-3.9) =$ _____ |
| 7. $\frac{4}{5} + \left(-\frac{1}{5}\right) =$ _____ | 8. $-1\frac{1}{3} + \left(-\frac{1}{3}\right) =$ _____ | 9. $-\frac{7}{8} + \frac{3}{8} =$ _____ |

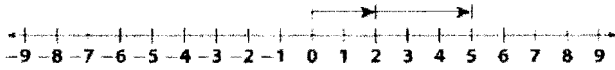
LESSON
3-2

Adding Rational Numbers

Practice and Problem Solving: D

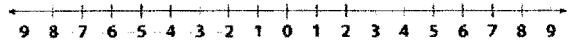
Use a number line to find each sum. The first one is done for you.

1. $2 + 3$

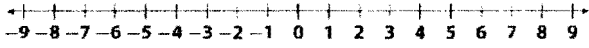


5

2. $-2 + 1$



3. $-5 + (-3)$



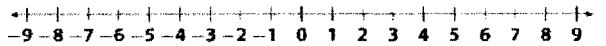
4. $-2 + 5$



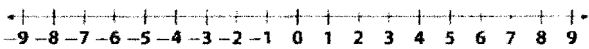
5. $1 + 7$



6. $-8 + 2$



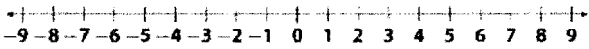
7. $1 + (-0.5)$



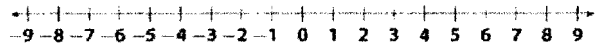
8. $-2.5 + 0.5$



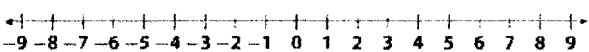
9. $0.5 + 1.5$



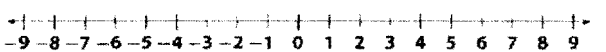
10. $-1 + \frac{1}{2}$



11. $\frac{1}{2} + 1\frac{1}{2}$



12. $-\frac{1}{2} + \frac{1}{2}$



Find each sum without using a number line. The first one is done for you.

13. $5 + (-1)$

4

14. $\frac{2}{3} + \frac{5}{3}$

15. $-\frac{1}{8} + \frac{7}{8}$

16. $-1.5 + (-1.9)$

17. $-2 + (-1.2)$

18. $-4.0 + 3.5$

19. $-1\frac{3}{4} + \frac{1}{4}$

20. $-7 + 4$

21. $-0.1 + (-0.8)$

LESSON
3-2**Adding Rational Numbers****Practice and Problem Solving: C****Find each sum.**

1. $3\frac{1}{4} + \left(-1\frac{1}{2}\right) + 2\frac{1}{4}$

2. $3\frac{3}{5} + \left(-1\frac{4}{9}\right) + \frac{1}{5}$

3. $-\frac{1}{9} + 8\frac{3}{5} - \frac{1}{15}$

4. $-3.5 + (-4.9) + 0.8$

5. $-\frac{1}{12} + \left(-3\frac{3}{8}\right) + \frac{4}{3}$

6. $-0.25 + (-1.65) + 0.77$

7. $-\frac{3}{4} + \frac{1}{5} + \frac{2}{9}$

8. $0.3 + (-5.5) + 5.2$

9. $-1.091 + 12.12 + (-1.1)$

10. $-3.24 + (-1.55) + 2.512$

11. $-1.27 + (-0.35) + (-0.13)$

12. $-1\frac{1}{2} + \left(-2\frac{12}{23}\right) + 5\frac{7}{46}$

Solve.

13. Marley bought an action figure for \$10.99, a board game for \$24.95 and a book for \$5.99. She paid with a \$50 bill. How much change did Marley receive?

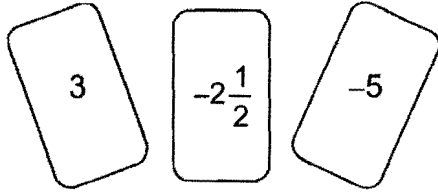
14. Tim bought a pen for \$2.25, a pencil for \$0.59, a notebook for \$6.49, and a highlighter for \$1.49. He used a coupon that gave him \$5.25 off his entire purchase. How much did he spend in total?

15. During the first hour of a snowstorm, $1\frac{1}{2}$ inches of snow fell. In the next hour, $4\frac{3}{8}$ inches fell. In the third hour, the snow stopped and $\frac{7}{8}$ inches of snow melted. How much snow was on the ground at the end of the third hour?

LESSON
3-3 **Subtracting Rational Numbers**

Reteach

The total value of the three cards shown is $-4\frac{1}{2}$.



What if you **take away** the $-2\frac{1}{2}$ card?

Cards 3 and -5 are left.
Their sum is -2.

$$\text{So, } -4\frac{1}{2} - \left(-2\frac{1}{2}\right) = -2.$$

What if you **take away** the -5 card?

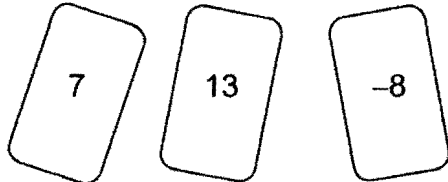
Cards 3 and $-2\frac{1}{2}$ are left.

Their sum is $\frac{1}{2}$.

$$\text{So, } -4\frac{1}{2} - (-5) = \frac{1}{2}$$

Answer each question.

1. The total value of the three cards shown is 12.



a. What is the value if you take away just the 7? _____

b. What is the value if you take away just the 13? _____

c. What is the value if you take away just the -8? _____

2. Subtract $-4 - (-2)$.

a. $-4 < -2$. So the answer will be a _____ number.

b. $|4| - |2| =$ _____

c. $-4 - (-2) =$ _____

Subtract.

3. $31 - (-9) =$ _____

4. $15 - 18 =$ _____

5. $-9 - 17 =$ _____

6. $2.6 - (-1.6) =$ _____

7. $4.5 - 2.5 =$ _____

8. $-2.0 - 1.25 =$ _____

9. $\frac{4}{5} - \left(-\frac{1}{5}\right) =$ _____

10. $-2\frac{1}{3} - \left(-\frac{1}{3}\right) =$ _____

11. $-\frac{7}{8} - \frac{3}{8} =$ _____

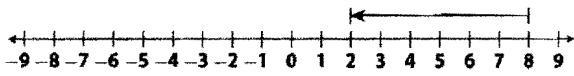
LESSON
3-3

Subtracting Rational Numbers

Practice and Problem Solving: D

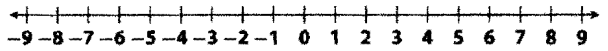
Use a number line to find each difference. The first one is done for you.

1. $8 - 6$

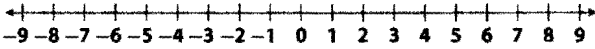


2

2. $5 - (-1)$

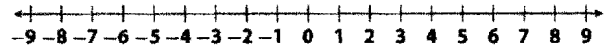


3. $-5 - (-2)$

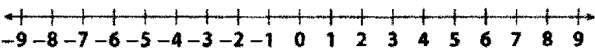


-3

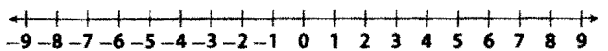
4. $-2 - 5$



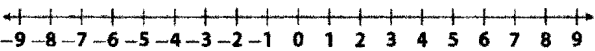
5. $1 - 4$



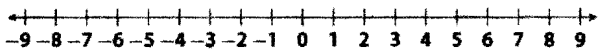
6. $4 - (-4)$



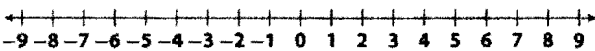
7. $1 - (-0.5)$



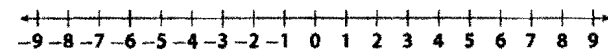
8. $-2 - 1$



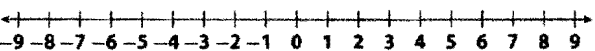
9. $1.5 - 3$



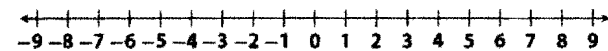
10. $2 - \frac{1}{2}$



11. $\frac{1}{2} - 1\frac{1}{2}$



12. $-\frac{1}{2} - 1$



Find each difference without using a number line. The first one is done for you.

13. $6 - (-1)$

7

14. $\frac{1}{3} - \frac{5}{3}$

15. $-\frac{1}{8} - \frac{3}{8}$

16. $-1.5 - (-2.9)$

17. $-2 - 0.2$

18. $-4.0 - 3.8$

19. $-1\frac{3}{4} - \frac{1}{4}$

20. $-2 - 4.5$

21. $-0.2 - 0.8$

LESSON
3-3**Subtracting Rational Numbers****Practice and Problem Solving: C**

Find each difference.

1. $-3\frac{1}{3} - 5\frac{2}{3} - \left(-2\frac{1}{3}\right)$

2. $3\frac{3}{7} - 1\frac{2}{3} - \frac{5}{7}$

3. $-\frac{1}{10} - 4\frac{3}{5} - 5\frac{3}{10}$

4. $-1.5 - 4.9 - 0.8$

5. $-\frac{1}{12} - 3\frac{3}{8} - \left(-\frac{4}{3}\right)$

6. $-9.54 - 1.651 - 0.988$

7. $-\frac{5}{6} - \frac{17}{18} - \left(-\frac{2}{9}\right)$

8. $-0.03 - (-5.51) - 5.12$

9. $-1.099 - 12.001 - 0.09$

10. $-1.02 - 1.99 - 1.34$

11. $-1.65 - (-0.45) - (-0.15)$

12. $-3\frac{1}{2} - \left(-5\frac{5}{9}\right) - 9\frac{1}{18}$

Solve.

13. If
- x
- equals
- $8 - (-2.25)$
- and
- y
- equals
- $6 - 4.2 - (-4.9)$
- , what is the value of
- $x - y$
- ?

14. Alex's score for a game is given by the expression
- $9 - 8.2 - (-1.9)$
- . Beth's score for the same game is
- $-8 - (-5.4) - 1.8$
- . Whose score was higher? By how much?

15. The temperature on Monday was
- 14°C
- . On Tuesday the temperature decreased by
- 5°
- . On Wednesday the temperature decreased another
- 10°
- . On Thursday the temperature increased by
- 8°
- . What was the temperature at the end of the day on Thursday?

LESSON
3-4**Multiplying Rational Numbers****Reteach**

You can use a number line to multiply rational numbers.

$$5 \times \left(-\frac{1}{2}\right)$$

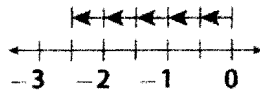
How many times is the $-\frac{1}{2}$ multiplied?

Five times, so there will be 5 jumps of $\frac{1}{2}$ unit each along the number line.

Your first jump begins at 0. In which direction should you move?

$-\frac{1}{2}$ is negative, and 5 is positive. They have different signs. So, each jump will be to the *left*.

(When both numbers have the same sign, each jump will be to the *right*.)



Name the numbers where each jump ends, from the first to the fifth jump.

$$-\frac{1}{2}, -1, -1\frac{1}{2}, -2, -2\frac{1}{2}$$

So, $5 \times \left(-\frac{1}{2}\right) = -2\frac{1}{2}$.

Find each product. Draw a number line for help.

1. $6 \times \frac{1}{4}$

Multiply $\frac{1}{4}$ how many times? _____

Which direction on the number line? _____

Move from 0 to where? _____ Product: _____

2. $-8(-3.3)$

Multiply (-3.3) how many times? _____

Move from 0 to where? _____ Product: _____

3. 4.6×5

Multiply 4.6 how many times? _____

Move from 0 to where? _____ Product: _____

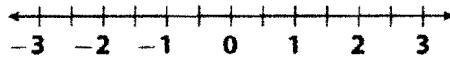
LESSON
3-4

Multiplying Rational Numbers

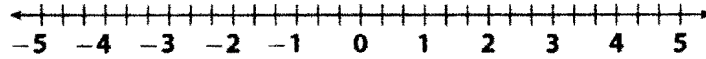
Practice and Problem Solving: D

Fill in the blanks to complete the computation. Refer to the number line if you need help. The first one in each group is done for you.

1. $6\left(-\frac{1}{2}\right) = \frac{\left(-\frac{1}{2}\right)}{\quad} + \frac{\left(-\frac{1}{2}\right)}{\quad} + \frac{\left(-\frac{1}{2}\right)}{\quad} + \frac{\left(-\frac{1}{2}\right)}{\quad} + \frac{\left(-\frac{1}{2}\right)}{\quad} + \frac{\left(-\frac{1}{2}\right)}{\quad} = \underline{-\frac{6}{2} \text{ or } -3}$



2. $-3\left(-\frac{2}{3}\right) = -\underline{\quad} - \underline{\quad} - \underline{\quad} = \underline{\quad}$



Write each addition expression as a multiplication expression. Then, solve. The first one is done for you.

3. $\frac{5}{8} + \frac{5}{8} + \frac{5}{8} + \frac{5}{8} = \underline{4} \times \frac{\underline{5}}{\underline{8}} = \underline{\frac{20}{8} \text{ or } 2\frac{1}{2}}$

4. $(-2.5) + (-2.5) = \underline{\quad} = \underline{\quad}$

5. $\left(-\frac{2}{9}\right) + \left(-\frac{2}{9}\right) + \left(-\frac{2}{9}\right) = \underline{\quad} = \underline{\quad}$

Fill in the missing steps. Then, find the answer. The first one is started for you.

6. $\left(-\frac{1}{4}\right) \times \frac{3}{5} \times \left(-\frac{2}{5}\right) = \underline{-\frac{1}{4}} \times \frac{\left(\underline{3 \times (-2)}\right)}{\underline{5 \times 5}} = \underline{-\frac{1}{4}} \times \underline{\quad} = \underline{\quad}$

7. $4(2.5)0.8 = \underline{\quad} \times \underline{\quad} \times 0.8 = \underline{\quad} \times 0.8 = \underline{\quad}$

Solve. The first one is started for you.

8. A seal dives when it see a whale. The seal dives for 5 seconds at an average rate of 3.5 meters per second.

a. Write an addition expression to represent how far the seal dives in 5 seconds. Find the sum.

$\underline{(-3.5) + (-3.5) + (-3.5) + (-3.5) + (-3.5)} = \underline{\quad}$

b. Write a multiplication expression to represent how far the seal dives in 5 seconds. Find the product.

LESSON
3-4

Multiplying Rational Numbers

Practice and Problem Solving: C

Compare the products by writing $<$ or $>$. Without doing the calculations, explain how you know your answers are correct.

1. $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \left(\frac{1}{2}\right)^3$ 1

2. $\left(-\frac{1}{2}\right) \times \left(-\frac{1}{2}\right) \times \left(-\frac{1}{2}\right) = \left(-\frac{1}{2}\right)^3$ 0

3. $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$ $\left(-\frac{1}{2}\right) \times \left(-\frac{1}{2}\right) \times \left(-\frac{1}{2}\right)$

4. $0.5(-1.1)$ 0

Tell whether each statement is *True* or *False*. Without doing the calculations, explain how you know your answers are correct.

5. $\left(-\frac{1}{2}\right)^6 < 0$ _____

6. $(1.5)^7 > 1$ _____

7. $(0.9)^4 > 1$ _____

Solve. (The formula for the volume of a sphere is $V = \frac{4}{3}\pi r^3$.)

8. The radius of a spherical balloon is $\frac{1}{2}$ foot. The radius of a second one is $\frac{3}{4}$ foot. How do the volumes of the balloons compare?

9. The radius of a sphere is reduced by one third. How does its volume change?

LESSON
3-5**Dividing Rational Numbers****Reteach**

To divide fractions:

- Multiply the first, or "top," number by the reciprocal of the second, or "bottom," number.
- Check the sign.

Divide: $-\frac{3}{5} \div \frac{2}{3}$

Step 1: Rewrite the problem to multiply by the reciprocal.

$$-\frac{3}{5} \div \frac{2}{3} = -\frac{3}{5} \times \frac{3}{2}$$

Step 2: Multiply.

$$-\frac{3}{5} \times \frac{3}{2} = \frac{-3 \times 3}{5 \times 2} = \frac{-9}{10}$$

Step 3: Check the sign.

A negative divided by a positive is a negative.

So, $\frac{-9}{10}$ is correct.

$$-\frac{3}{5} \div \frac{2}{3} = -\frac{9}{10}$$

Write the sign of each quotient.

1. $4\frac{1}{4} \div 3\frac{1}{2}$

2. $-3.5 \div 0.675$

3. $\frac{5}{\left(\frac{-3}{5}\right)}$

4. $-\frac{2}{9} \div \left(-\frac{3}{8}\right)$

Complete the steps described above to find each quotient.

5. $-\frac{1}{7} \div \left(-\frac{5}{9}\right)$

6. $\frac{7}{8} \div \frac{8}{9}$

Step 1: _____

Step 1: _____

Step 2: _____

Step 2: _____

Step 3: _____

Step 3: _____

LESSON
3-5

Dividing Rational Numbers

Practice and Problem Solving: D

Write the missing number. Then, solve. The first one is done for you.

$$1. -6 \div \frac{3}{4} = -6 \times \frac{4}{3}$$

$$\underline{-8}$$

$$2. \frac{4}{5} \div 8 = \frac{4}{5} \times \underline{\hspace{2cm}}$$

$$3. \frac{-7}{8} \div \frac{7}{-4} = \frac{-7}{8} \times \underline{\hspace{2cm}}$$

$$4. \frac{\left(\frac{5}{-3}\right)}{\left(\frac{7}{8}\right)} = \left(\frac{5}{-3}\right) \times \underline{\hspace{2cm}}$$

$$5. \frac{-2}{\left(\frac{4}{9}\right)} = -2 \times \underline{\hspace{2cm}}$$

$$6. \frac{\left(-4\frac{3}{4}\right)}{4} = -\frac{19}{4} \times \underline{\hspace{2cm}}$$

Solve. The first one is done for you.

$$7. \frac{-1}{8} \div -5 = \frac{-1}{8} \times -\frac{1}{5} = \underline{\hspace{2cm}}$$

$$\underline{\frac{1}{40}}$$

$$8. \frac{\left(2\frac{1}{4}\right)}{\left(\frac{-6}{7}\right)} = \frac{9}{4} \times -\frac{7}{6} = \underline{\hspace{2cm}}$$

$$9. 3 \div \frac{6}{7} = \frac{3}{1} \times \frac{7}{6} = \underline{\hspace{2cm}}$$

Find the missing numbers. Add zeros as needed. Then, solve. The first one is done for you.

$$10. 0.4 \div 2.5 \rightarrow 2.5 \overline{)0.40}$$

$$\underline{0.40; 0.16}$$

$$11. \frac{-4.75}{0.3} \rightarrow ? \overline{)4.75}$$

$$12. 8 \div 2.5 \rightarrow 2.5 \overline{)8}$$

Solve.

13. The town's highway department marks a new road with reflective markers. The road is $6\frac{3}{4}$ miles in length. The markers are spaced every eighthth $\left(\frac{1}{8}\right)$ of a mile.

a. Write a division problem to find how many markers are installed.

b. Solve the problem.

c. Explain the answer.

LESSON **Dividing Rational Numbers**

3-5 **Practice and Problem Solving: C**

Write each quotient two other ways by moving the negative sign.

1. $\frac{-1}{5} =$ _____ 2. $\frac{-7}{30} =$ _____ 3. $\frac{1}{-2} =$ _____
 = _____ = _____ = _____

Use >, <, or = to compare the quotients. Show the quotients.

4. $(4 \times \frac{1}{3}) \div \frac{2}{5}$ ○ $4 \times (\frac{1}{3} \div \frac{2}{5})$ 5. $(4.5 \div 0.5) \div 3$ ○ $4.5 \div (0.5 \div 3)$

6. $(6 \div -\frac{1}{5}) \times -\frac{4}{3}$ ○ $6 \div (-\frac{1}{5} \times -\frac{4}{3})$ 7. $5.5(-3 \times 7.5)$ ○ $7.5(-3 \times 5.5)$

Use decimals to rewrite each quotient. Then, solve.

8. $\frac{(\frac{2}{5})}{(-\frac{5}{8})}$ 9. $\frac{(-5\frac{2}{5})}{(-\frac{5}{16})}$ 10. $\frac{(\frac{1}{4})}{(\frac{3}{5})}$

Write each quotient as a decimal and as a fraction. Show your work.

11. $\frac{(1 + \frac{1}{2} + \frac{1}{4})}{(1 - \frac{1}{2} - \frac{1}{4})}$ _____

12. $\frac{(1 + \frac{1}{3} + \frac{1}{6})}{(1 - \frac{1}{3} - \frac{1}{6})}$ _____

13. $\frac{(1 + \frac{1}{4} + \frac{1}{8})}{(1 - \frac{1}{4} - \frac{1}{8})}$ _____

14. If the 4s in question 13 are replaced with 5s, and the 8s are replaced with 10s, how will the quotient compare to the other three quotients? Explain.

LESSON
3-6

Applying Rational Number Operations

Reteach

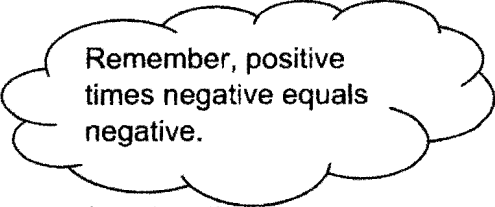
To multiply fractions and mixed numbers:

Step 1: Write any mixed numbers as improper fractions.

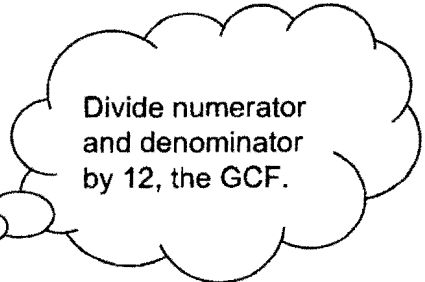
Step 2: Multiply the numerators.

Step 3: Multiply the denominators.

Step 4: Write the answer in simplest form.



$$\begin{aligned} \text{Multiply: } & \frac{4}{9} \cdot \frac{8}{3} \\ \frac{4}{9} \cdot \frac{3}{8} &= \frac{4 \cdot 3}{9 \cdot 8} \\ &= \frac{12}{72} \\ &= \frac{1}{6} \end{aligned}$$



$$\begin{aligned} \text{Multiply: } & 6\frac{1}{4} \cdot \left(-1\frac{4}{5}\right) \\ 6\frac{1}{4} \cdot \left(-1\frac{4}{5}\right) &= \frac{25}{4} \cdot \left(\frac{-9}{5}\right) \\ &= \frac{25 \cdot (-9)}{4 \cdot 5} \\ &= \frac{-225}{20} \\ &= -11\frac{1}{4} \end{aligned}$$

Use the models to solve the problems.

1. One cup of dog food weighs $1\frac{4}{5}$ ounces. A police dog eats $6\frac{1}{3}$ cups of food a day. How many ounces of food does the dog eat each day?

2. A painter spends 3 hours working on a painting. A sculptor spends $2\frac{2}{3}$ as long working on a sculpture. How long does the sculptor work?

3. A meteorite found in the United States weighs $\frac{7}{10}$ as much as one found in Mongolia. The meteorite found in Mongolia weighs 22 tons. How much does the one found in the United States weigh?

4. A chicken salad recipe calls for $\frac{1}{8}$ pound of chicken per serving. How many pounds of chicken are needed to make $8\frac{1}{2}$ servings?

LESSON
3-6

Applying Rational Number Operations

Practice and Problem Solving: D

Solve. Show your work. The first one has been done for you.

1. A middle school conducts a recycling drive, during which $\frac{1}{5}$ of the materials collected were bottles and $\frac{1}{4}$ was paper. Cardboard boxes made up $\frac{1}{10}$ of the material. How much of the total do these three categories of items represent?

The LCM of the three denominators, 4, 5, and 10, is 20.

Multiply each fraction to get a common denominator of 20.

$$\frac{1}{5} \cdot \frac{4}{4} = \frac{4}{20}$$

$$\frac{1}{4} \cdot \frac{5}{5} = \frac{5}{20}$$

$$\frac{1}{10} \cdot \frac{2}{2} = \frac{2}{20}$$

Add the fractions: $\frac{4}{20} + \frac{5}{20} + \frac{2}{20} = \frac{11}{20}$

Bottles, paper, and cardboard boxes were $\frac{11}{20}$ of the total amount of recycled

material collected by the middle school.

2. A family budgets $\frac{1}{2}$ of its income for housing and $\frac{1}{3}$ for food. What fraction of their budget do these expenses cover?

3. Decorations for the seventh-grade dance take $\frac{1}{6}$ of the student council's budget. Entertainment takes $\frac{3}{8}$ of the budget. What fraction of the budget do these expenses cover? What fraction is left for other activities? (*Hint:* To answer the second question, subtract the answer to the first question from 1, which represents the whole budget.)

Applying Rational Number Operations**Practice and Problem Solving: C**

Use the information given in the table below to complete Exercises 1–4.

Planets' Orbital Velocity

Planet	Orbital Velocity (mi/s)
Mercury	29.74
Venus	21.76
Earth	18.5
Mars	14.99
Jupiter	8.12
Saturn	6.02
Uranus	4.23

Solve. Show your work. Express the answer in fraction form.

1. How many miles does Mercury travel in an hour? Simplify the fractions in your answer.

2. How much greater is the orbital velocity of Mercury than Jupiter? Simplify the fractions in your answer.

3. During the time it takes Saturn to travel 32,508 miles, how much time in seconds has elapsed on Earth? Simplify the fractions in your answer.

4. How many miles does Venus travel in a minute? Simplify the fractions in your answer.

MODULE
3**Rational Numbers****Challenge**

1. A meteorologist is measuring the change in temperature in three cities. For five days, she recorded the daily temperature in each city.

Temperatures (°C) in Three Cities

City	Monday	Tuesday	Wednesday	Thursday	Friday
City A	$-\frac{1}{8}$	$2\frac{1}{4}$	$-3\frac{1}{2}$	$5\frac{4}{5}$	$-12\frac{1}{2}$
City B	$4\frac{1}{5}$	$-1\frac{3}{5}$	$-8\frac{1}{10}$	$11\frac{1}{5}$	$3\frac{3}{10}$
City C	$11\frac{1}{3}$	$2\frac{5}{6}$	$-3\frac{2}{3}$	$-9\frac{1}{6}$	$2\frac{1}{3}$

The temperature change is the difference between the temperature on a certain day and the temperature the day before.

For example, in City A the temperature change from Monday to

Tuesday was $2\frac{1}{4} - \left(-\frac{1}{8}\right) = 2\frac{3}{8}$.

The meteorologist defines the “temperature volatility” to be the sum of the daily temperature changes over a certain period of time.

Which city had the greatest temperature volatility for the five-day period shown?

2. In the mathematical expression below, the three boxes can be filled with any operation symbol (+, −, ×, or ÷).

$$2 \square -\frac{1}{8} \square -10 \square 16$$

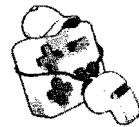
Each operation symbol can only be used once.

For example, the boxes can be filled as shown below:

$$2 \div -\frac{1}{8} \square -10 \square + 16, \text{ which equals } 10.$$

How can the operations be placed in the boxes to yield the greatest possible value for the expression? (Hint: Remember to multiply and divide before you add and subtract.)

to Go On?



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3.1 Rational Numbers and Decimals

Write each mixed number as a decimal.

1. $4\frac{1}{5}$ _____

2. $12\frac{14}{15}$ _____

3. $5\frac{5}{32}$ _____

3.2 Adding Rational Numbers

Find each sum.

4. $4.5 + 7.1 =$ _____

5. $5\frac{1}{6} + (-3\frac{5}{6}) =$ _____

3.3 Subtracting Rational Numbers

Find each difference.

6. $-\frac{1}{8} - (6\frac{7}{8}) =$ _____

7. $14.2 - (-4.9) =$ _____

3.4 Multiplying Rational Numbers

Multiply.

8. $-4(\frac{7}{10}) =$ _____

9. $-3.2(-5.6)(4) =$ _____

3.5 Dividing Rational Numbers

Find each quotient.

10. $-\frac{19}{2} \div \frac{38}{7} =$ _____

11. $\frac{-32.01}{-3.3} =$ _____

3.6 Applying Rational Number Operations

12. Luis bought stock at \$83.60. The next day, the price increased \$15.35. This new price changed by $-4\frac{3}{4}\%$ the following day. What was the final stock price? Is your answer reasonable? Explain.



ESSENTIAL QUESTION

13. How can you use negative numbers to represent real-world problems?
