

School Home Letter

Module 1: Integer Concepts

Dear Family,

During the next 5 school days, we will be learning about positive and negative integers, including how to compare them and how to find their absolute values. In this module, we will also be learning new Math vocabulary. You can find definitions for these terms in the eGlossary.

Along the way, ask about these concepts. When students explain or show how to solve a problem, it helps them make sense of the mathematics and deepens their understanding. Go to the *Family Resources* and use digital resources with your child to learn together.

Vocabulary

absolute value
inequality
integer
negative number
opposites
positive number

Lesson	Family Resources Online Support
1.1 Identify and Interpret Integers	More Practice/Homework, Problems 5–7, Math on the Spot Video
1.2 Compare and Order Integers on a Number Line	More Practice/Homework, Problem 6, Math on the Spot Video
1.3 Find and Apply Absolute Value	More Practice/Homework, Problems 8 and 9, Math on the Spot Video

Home Activity

Work with your child to identify negative numbers in everyday life outside of school. Examples might be negative bank balances or temperatures. Talk about where these numbers are located on a number line, how far they are from 0, and which positive numbers are the same distance from 0. Choose two real-world negative numbers and compare them, discussing how you know which is greater.

Carta a la familia

Módulo 1: Conceptos de números enteros

Estimada familia:

Durante los próximos 5 días escolares, estudiaremos los enteros positivos y negativos y aprenderemos a compararlos y calcular sus valores absolutos. En este módulo, también aprenderemos nuevos términos matemáticos. Podrá consultar las definiciones de estos términos en el eGlosario.

En ese tiempo, pregunten acerca de estos conceptos. Cuando los estudiantes explican o muestran cómo resolver un problema, les ayuda a encontrarles sentido a las matemáticas y a profundizar su comprensión. Ingrese en *Recursos familiares* y utilice los recursos digitales con su hijo(a) para estudiar juntos.

Vocabulario

valor absoluto
desigualdad
entero
número negativo
opuestos
número positivo

Lección		Apoyo en línea para recursos familiares
1.1	Identifica e interpreta los enteros	Más práctica/Tarea, Problemas 5, 6 y 7, Video de matemáticas al instante
1.2	Compara y ordena enteros en una recta numérica	Más práctica/Tarea, Problema 6, Video de matemáticas al instante
1.3	Encuentra y aplica el valor absoluto	Más práctica/Tarea, Problemas 8 y 9, Video de matemáticas al instante

Actividad para la casa

Identifique con su hijo(a) números negativos en la vida diaria fuera de la escuela. Los ejemplos podrían ser temperaturas o saldos bancarios negativos. Explíquelo dónde se ubican estos números en una recta numérica, a qué distancia están del 0 y qué números positivos están a la misma distancia del 0. Elija dos números negativos en el mundo real y compárelos, luego analice cómo sabe cuál es mayor.

Integer Concepts

Identify and Interpret Integers

Description	Integer
A decrease of \$30	-\$30
5 degrees below zero Celsius	-5 °C
30 feet below sea level	-30 feet
\$100 debit in checking account	-\$100 balance

The opposite of -1 is 1 because they are the same distance from zero.



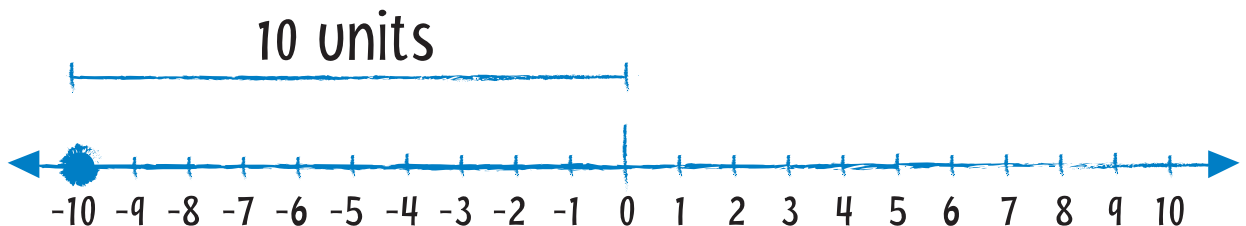
Compare and Order Integers



$$-3 < -2 \quad -2 < 3 \quad -2 > -3 \quad 3 > -3$$

Find Absolute Value

-10 is 10 units from 0 on the number line.



Even though $-\$100 < -\50 , someone owing \$100 owes more than someone owing \$50, because $|-100| > |-50|$.

Identify and Interpret Integers

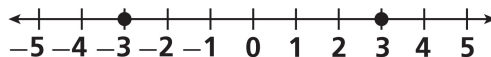
Integers are the set of all whole numbers and their opposites.

Negative numbers are less than 0 and are always written with the negative sign ($-$). Use negative numbers to indicate a loss or decrease.

a decrease of 15 points	-15
a bank withdrawal of \$10	-10
a temperature of 5° below zero	-5
3 units left of zero	-3

Positive numbers are greater than 0 and can be written with or without the positive sign ($+$). Use positive numbers to indicate a gain or increase.

an increase of 15 points	$+15$
a bank deposit of \$10	$+10$
a temperature of 5° above zero	$+5$
3 units right of zero	$+3$



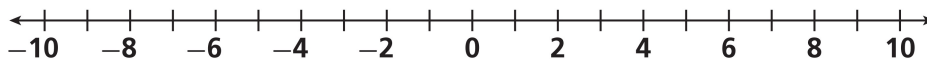
Opposites are the same distance from zero on a number line, but in different directions. -3 and 3 are opposites because each number is 3 units from zero on a number line.

Represent using integers.

- | | | | |
|----------------------------|-----------------------|-------------------------|-------------------------------|
| 1. 72° above zero | 2. a loss of 4 points | 3. a withdrawal of \$25 | 4. 1,250 feet above sea level |
| _____ | _____ | _____ | _____ |

Write the opposite of each integer. Graph each opposite on the number line.

- | | | | |
|---------|--------|--------|---------|
| 5. -2 | 6. 8 | 7. 3 | 8. -5 |
| _____ | _____ | _____ | _____ |



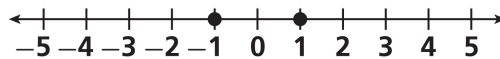
9. On Monday, Logan deposits \$20 in his checking account. On Tuesday, he buys a sandwich for \$6. On Friday, he withdraws \$50. Write the integers that represent the transactions Logan made.

10. Marissa collects action figures. The change in value for one of her action figures is $-\$12$. Describe the meaning of this integer.

Compare and Order Integers on a Number Line

A number line can be used to compare and order integers.

As you move right on the number line,
the values of the integers increase.

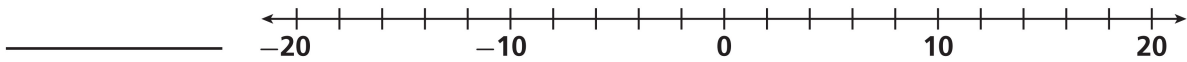


As you move left on the number line,
the values of the integers decrease.

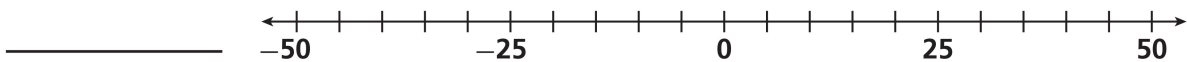
- A.** Compare -1 and 1 . -1 is to the left of 1 , so $-1 < 1$.
- B.** Compare 2 and -2 . 2 is to the right of -2 , so $2 > -2$.

Graph the numbers on the number line. Then write an inequality to compare the numbers.

- 1.** 8 and -12



- 2.** -47 and 39



- 3.** The average temperature on the planet Mars is -60°C . At noon, temperatures at the equator of Mars may reach a high of 20°C . Is this temperature higher or lower than the average temperature? Write an inequality to support your answer.

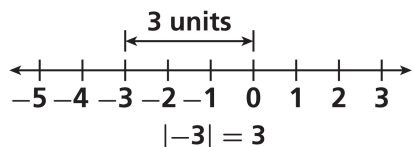
- 4.** Brody and Sullivan chose cards from a deck of cards with both positive and negative numbers. Brody picked -4 and Sullivan picked -12 . Who picked the greater number?

- 5.** The table shows the number of points gained or lost in each round of a game. Order the scores from each round from greatest to least.

Round 1	-3
Round 2	2
Round 3	4
Round 4	-1

Find and Apply Absolute Value

The *absolute value* of a number is its distance from zero on a number line. The absolute value of a number is the *magnitude* of the number without regard to its sign. The absolute value of a number is written using the symbols $| \ |$.



A. What is the absolute value of -5 ? $|-5| = 5$

B. What is the absolute value of 5 ? $|5| = 5$

Find each absolute value.

1. $|-27|$

2. $|52|$

3. $|78|$

4. $|-137|$

Determine which number has a greater magnitude.

5. 2 and -7

6. -35 and -25

7. -5 and 9

8. -3 and -5

9. The change in temperature from Monday to Friday was 2°C . The change in temperature over the weekend was -4°C . Which represents the greater change in temperature?

10. Mt. Everest is the tallest mountain on Earth at 29,029 feet above sea level. Challenger Deep in the Mariana Trench is the deepest known point in Earth's oceans at 36,070 feet below sea level. Represent each distance from sea level using integers. Which location has the lesser magnitude?

11. Mackenzie is playing a card game. The cards have positive and negative numbers printed on them. Mackenzie says that the absolute value of the number on her card is 9. What is the number on Mackenzie's card? Explain.

School Home Letter

Module 2: Rational Number Concepts

Dear Family,

During the next 5 school days, we will be learning to interpret, compare, and order rational numbers. In this module, we will also be learning new Math vocabulary. You can find definitions for these terms in the eGlossary.

Along the way, ask about these concepts. When students explain or show how to solve a problem, it helps them make sense of the mathematics and deepens their understanding. Go to the *Family Resources* and use digital resources with your child to learn together.

Vocabulary

greatest common
factor
least common
multiple
rational number

Lesson	Family Resources Online Support
2.1 Interpret Rational Numbers	Interactive Reteach, Lesson 2.1
2.2 Compare Rational Numbers on a Number Line	Interactive Reteach, Lesson 2.2
2.3 Find and Apply LCM and GCF	More Practice/Homework, Problems 5–7, Math on the Spot Video
2.4 Order Rational Numbers	Interactive Reteach, Lesson 2.4

Home Activity

To practice comparing fractions, play the following game with your child. Remove the face cards from a standard deck of cards, and deal half of the remaining cards to each player. Players should stack their cards facedown without looking at them. At the same time, both players turn up their top two cards. Each player uses his or her cards to write a fraction with the lesser number in the numerator. The player with the greater fraction wins all four cards. If there is a tie, each player takes back his or her cards. Play continues with both players turning up their next two cards, writing fractions, and comparing. The player who ends with more cards is the winner.

Carta a la familia

Módulo 2: Conceptos de números racionales

Estimada familia:

Durante los próximos 5 días escolares, aprenderemos a interpretar, comparar y ordenar números racionales. En este módulo, también aprenderemos nuevos términos matemáticos. Podrá consultar las definiciones de estos términos en el eGlosario.

En ese tiempo, pregunten acerca de estos conceptos. Cuando los estudiantes explican o muestran cómo resolver un problema, les ayuda a encontrarles sentido a las matemáticas y a profundizar su comprensión. Ingrese en *Recursos familiares* y utilice los recursos digitales con su hijo(a) para estudiar juntos.

Vocabulario

máximo común
divisor
mínimo común
múltiplo
número racional

Lección		Apoyo en línea para recursos familiares
2.1	Interpreta los números racionales	Refuerzo interactivo, Lección 2.1
2.2	Compara los números racionales en una recta numérica	Refuerzo interactivo, Lección 2.2
2.3	Encontrar y aplicar el MCM y el MCD	Más práctica/Tarea, Problemas 5, 6 y 7, Video de matemáticas al instante
2.4	Ordena los números racionales	Refuerzo interactivo, Lección 2.4

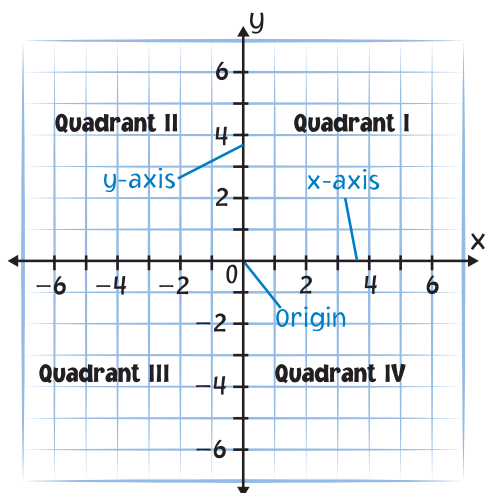
Actividad para la casa

Para ejercitar la comparación de fracciones, practique el siguiente juego con su hijo(a). Quite las cartas con figuras de un mazo de cartas estándar y reparta la mitad de las cartas restantes a cada jugador. Los jugadores deben apilar sus cartas boca abajo sin mirarlas. Ambos jugadores deben dar vuelta las dos primeras cartas de la pila al mismo tiempo. Cada jugador usará sus cartas para escribir una fracción con el número más bajo en el numerador. El jugador que tiene la mayor fracción gana todas las cartas. Si hay un empate, cada jugador recupera sus cartas. El juego continúa y ambos jugadores deben dar vuelta las dos cartas siguientes, escribir las fracciones y compararlas. El jugador que obtiene la mayor cantidad de cartas es el ganador.

Polygons on the Coordinate Plane

The Coordinate Plane

The **coordinate plane** is formed by two number lines that intersect at right angles. The point of intersection is 0 on each number line.

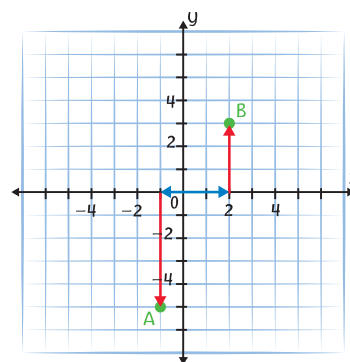


Graphing Points in the Coordinate Plane

An ordered pair gives the location of a point on a coordinate plane.

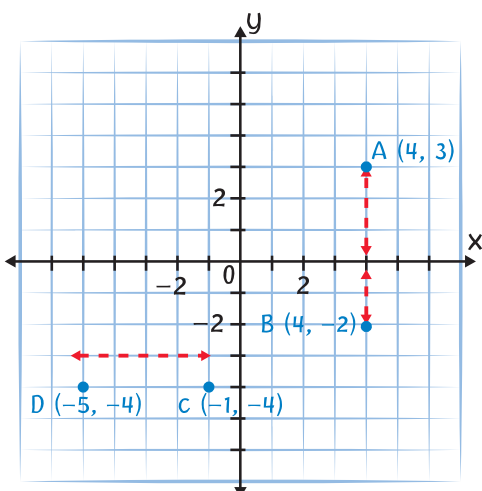
Point A is 1 unit left of the origin and 5 units down. Point A is located at $(-1, -5)$.

Point B is 2 units right of the origin and 3 units up. Point B is located at $(2, 3)$.



Finding Distances in the Coordinate Plane

You can use **absolute values** to find distances between two points that have the same x-coordinates or the same y-coordinates on a coordinate plane.

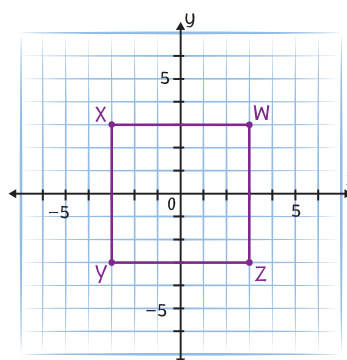


Distance from A to B = $|3| + |-2| = 3 + 2 = 5$ units.
Distance from C to D = $|-5| - |-1| = 5 - 1 = 4$ units.

Perimeter and Area on the Coordinate Plane

To find the perimeter of a polygon in the coordinate plane, find the distances between the vertices and add them.

To find the area of a polygon in the coordinate plane, find the distances you need for the figure. Then use an area formula.



W (3, 3)
X (-3, 3)
Y (-3, -3)
Z (3, -3)

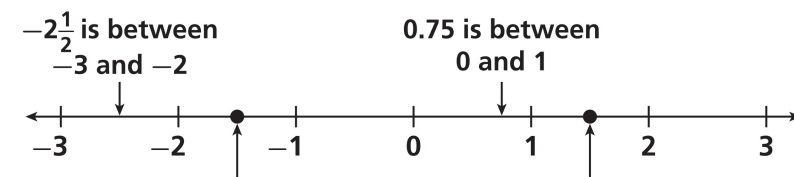
Figure WXYZ is a square with side length 6 units.

Perimeter = $6 + 6 + 6 + 6 = 24$ units
Area = $s^2 = 6 \times 6 = 36$ square units

Interpret Rational Numbers

Decimals, fractions, and integers are all **rational numbers**.

Rational numbers can be graphed on a number line. Decimals and fractions are located between integers on a number line.



Opposites are the same distance from zero on a number line, but in different directions.

$-1\frac{1}{2}$ and $1\frac{1}{2}$ are opposites because each number is $1\frac{1}{2}$ units from zero on a number line.

The **absolute value** of a rational number is the distance from zero to the number on a number line. Opposites have the same absolute value.

Graph each number and its opposite on the number line.

$$-2\frac{3}{4}, -0.8, 1.25$$

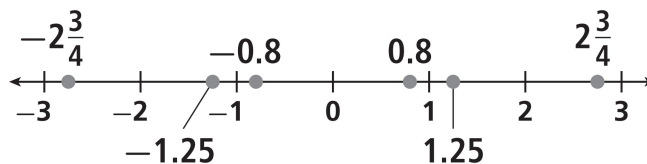
- A.** What are the opposites of each number?

$$2\frac{3}{4}, 0.8, -1.25$$

- B.** Between what two integers are the numbers?

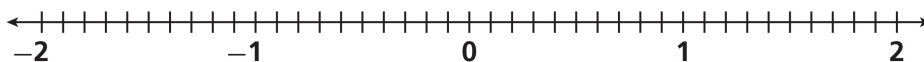
$-2\frac{3}{4}$ is between -3 and -2 ; $2\frac{3}{4}$ is between 2 and 3
 0.8 is between 0 and 1 ; -0.8 is between -1 and 0
 -1.25 is between -2 and -1 ; 1.25 is between 1 and 2

- C.** Plot and label on the number line.



- 1.** Graph each number and its opposite on the number line.

$$\frac{2}{10}, 1\frac{3}{10}, \frac{8}{10}, \frac{7}{10}$$



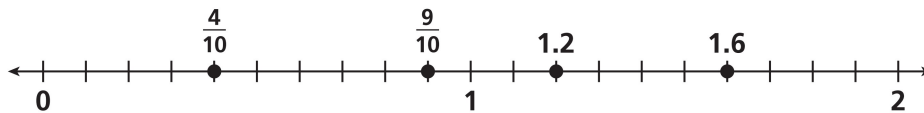
Find the opposite and absolute value of each number.

2. $\frac{7}{11}$ _____ 3. -5.17 _____ 4. $-1\frac{1}{4}$ _____
 5. 0.68 _____ 6. -8.34 _____ 7. $\frac{5}{9}$ _____

Compare Rational Numbers on a Number Line

You can **compare** rational numbers by graphing them on a number line.

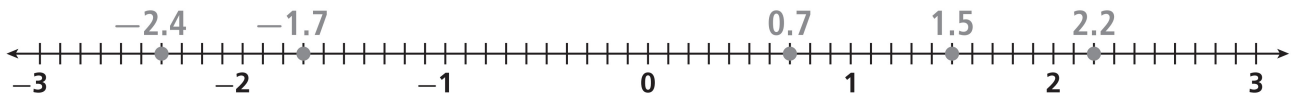
Because $\frac{4}{10}$ is to the left of $\frac{9}{10}$
 $\frac{4}{10} < \frac{9}{10}$



Because 1.6 is to the right of 1.2
 $1.6 > 1.2$

The organizers of a snowshoe race record the difference in time between 5 racers' times and the average time to complete the race. Each value is the amount of time above or below the average in minutes.

1.5, -2.4, 0.7, 2.2, -1.7



A. Graph each number on the number line and label it.

B. Complete the inequality statements.

$$1.5 \boxed{>} 0.7$$

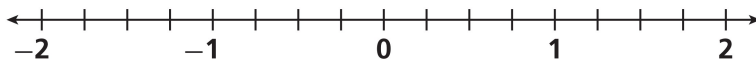
$$-2.4 \boxed{<} -1.7$$

The tick marks on the number line represent tenths. Count in between the integers to know where to place each number.

1.5 is to the right of 0.7, so it is greater than 0.7.

-2.4 is to the left of -1.7, so it is less than -1.7.

Use the number line to compare the rational numbers.



1. $-1\frac{1}{2} \boxed{} -1.75$ 2. $\frac{1}{4} \boxed{} 0.5$ 3. $-1\frac{1}{4} \boxed{} -1\frac{3}{4}$

4. $1.5 \boxed{} -1.75$ 5. $-\frac{3}{4} \boxed{} -\frac{1}{4}$ 6. $1\frac{1}{4} \boxed{} -\frac{3}{4}$

Find and Apply LCM and GCF**Multiples of 3:** 3, 6, 9, 12, 15, 18, 21, 24 . . .**Multiples of 4:** 4, 8, 12, 16, 20, 24, 28 . . .

A **common multiple** is a number that is a multiple of two or more numbers.

The common multiples of 3 and 4 are 12, 24, . . .

The **least common multiple** (LCM) of two numbers is the smallest number that is a multiple of both numbers.

The LCM of 3 and 4 is 12.

Factors of 12: 1, 2, 3, 4, 6, 12**Factors of 16:** 1, 2, 4, 8, 16

A **common factor** is a number that is the factor of two or more numbers.

The common factors of 12 and 16 are 1, 2, and 4.

The **greatest common factor** (GCF) of two numbers is the largest number that is a factor of both numbers.

The GCF of 12 and 16 is 4.

Hot dogs are sold in packages of 10. Hot dog buns are sold in packages of 8. What is the fewest number of packages of each that could be bought in order to have the same number of hot dogs and buns?

- A.** List multiples of 8 and multiples of 10.
- B.** Find the least common multiple of 8 and 10.
- C.** Determine how many packages of each you would buy to get the LCM.
- D.** State your answer.

Multiples of 8: 8, 16, 24, 32, 40, 48, . . .

Multiples of 10: 10, 20, 30, 40, 50, . . .

The least common multiple of 8 and 10 is 40.

Hot dogs: $40 \div 10 = 4$

Hot dog buns: $40 \div 8 = 5$

You would need to buy 4 packages of hot dogs and 5 packages of hot dog buns.

- 1.** A florist has 49 red roses and 63 white roses. The florist wants to put an equal number of red roses in each centerpiece, along with an equal number of white roses in each, using all the flowers. What is the greatest number of centerpieces the florist can make, and how many of each flower will each centerpiece have?

Find the GCF and LCM for the number pair.

2. 16 and 24 GCF: _____ LCM: _____

3. 18 and 27 GCF: _____ LCM: _____

Order Rational Numbers

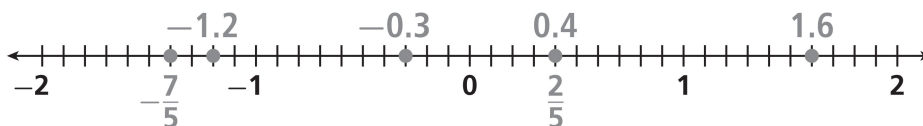
To compare rational numbers in different forms:

- Convert all the numbers to the same form—either fractions or decimals.
- Graph them on a number line.

Order the following numbers from least to greatest.

$$-0.3, -1.2, 1.6, \frac{2}{5}, -\frac{7}{5}$$

- A.** Rewrite each fraction as a decimal. $\frac{2}{5} = 0.4$ $-\frac{7}{5} = -1.40$
- B.** Graph the numbers on the number line. Be sure to label each number as you plot it on the number line.



- C.** State your answer. $-\frac{7}{5}, -1.2, -0.3, \frac{2}{5}, 1.6$

- 1.** Carolyn records the temperatures in degrees Celsius for a week: -0.2° , 1.09° , -1.6° , -1.74° , 0.48° . Write the temperatures in order from coldest to warmest.

- 2.** On a map, the distances from the town library to the park, the recreation center, and the baseball fields are measured in centimeters. The distances in centimeters are: $1\frac{3}{10}$, 2.4, $2\frac{2}{10}$. Write the distances in order from least to greatest.

- 3.** Order the following daily changes in five stock prices from least to greatest in fraction form with a common denominator: $-1\frac{37}{100}$, -1.41 , 1.95, $1\frac{9}{10}$.

Order the rational numbers from least to greatest.

- 4.** $\frac{5}{8}$, -0.15 , $-\frac{2}{5}$, 0.50 **5.** -3.2 , $1\frac{3}{5}$, $-2\frac{7}{10}$, 1.4 **6.** -0.75 , $-\frac{7}{10}$, $-\frac{9}{5}$, 1.5

School Home Letter

Module 3: Fraction Division

Dear Family,

During the next 9 school days, we will be learning how to divide fractions and mixed numbers. In this module, we will also be learning new Math vocabulary. You can find definitions for these terms in the eGlossary.

Along the way, ask about these concepts. When students explain or show how to solve a problem, it helps them make sense of the mathematics and deepens their understanding. Go to the *Family Resources* and use digital resources with your child to learn together.

Vocabulary

multiplicative
inverse
reciprocal

Lesson	Family Resources Online Support
3.1 Understand Fraction Division	Interactive Reteach, Lesson 3.1
3.2 Explore Division of Fractions with Unlike Denominators	More Practice/Homework, Problem 3, Math on the Spot Video
3.3 Explore Division of Mixed Numbers	More Practice/Homework, Problem 4, Math on the Spot Video
3.4 Practice and Apply Division of Fractions and Mixed Numbers	More Practice/Homework, Problem 3, Math on the Spot Video
3.5 Practice Fraction Operations	More Practice/Homework, Problem 3, Math on the Spot Video

Home Activity

Find a piece of string, ribbon, or yarn that is long enough to easily fold in half twice. Measure the entire length to the nearest eighth of an inch. Working together, use division to predict the length of each section of the string, ribbon, or yarn when it is cut into four equal pieces. Fold the piece in half and cut at the fold. Then, fold each half in half and cut at the fold. Measure each quarter of the string, ribbon, or yarn to see how close your prediction was.

Carta a la familia

Módulo 3: División de fracciones

Estimada familia:

Durante los próximos 9 días escolares, aprenderemos a dividir fracciones y números mixtos. En este módulo, también aprenderemos un nuevo vocabulario matemático. Pueden encontrar las definiciones de estos términos en el eGlosario.

En ese tiempo, pregunten acerca de estos conceptos. Cuando los estudiantes explican o muestran cómo resolver un problema, les ayuda a encontrarles sentido a las matemáticas y a profundizar su comprensión. Vayan a los *Recursos familiares* y usen recursos digitales con su hijo(a) para que aprendan juntos.

Vocabulario

inverso
multiplicativo
recíproco

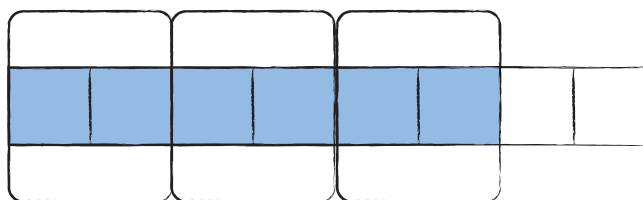
Lección		Apoyo en línea para recursos familiares
3.1	Comprende la división de fracciones	Refuerzo interactivo, Lección 3.1
3.2	Explora la división de fracciones con denominadores distintos	Más práctica/Tarea, Problema 3, Video de Matemáticas al instante
3.3	Explora la división de números mixtos	Más práctica/Tarea, Problema 4, Video de Matemáticas al instante
3.4	Practica y aplica la división de fracciones y números mixtos	Más práctica/Tarea, Problema 3, Video de Matemáticas al instante
3.5	Practica las operaciones de fracciones	Más práctica/Tarea, Problema 3, Video de Matemáticas al instante

Actividad para la casa

Consíganse un trozo de cuerda, cinta o estambre que se pueda doblar por la mitad fácilmente. Midan la longitud completa al octavo de pulgada más cercano. Trabajen juntos y usen la división para predecir la longitud de cada sección de la cuerda, cinta o estambre cuando se corta en cuatro trozos iguales. Doble el trozo por la mitad y corten en el doblez. Midan cada cuarto de cuerda, cinta o estambre para ver si su predicción estuvo cerca o no.

Fraction Division

Dividing with models
(like denominators)



$$\frac{6}{8} \div \frac{2}{8} = 3$$

Using the reciprocal/ multiplicative
inverse

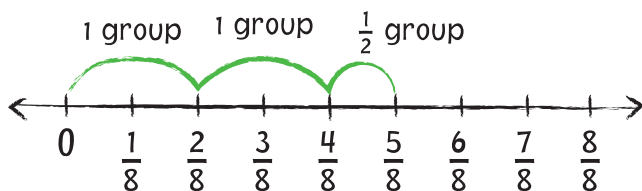
Like denominators:

$$\frac{6}{8} \div \frac{2}{8} = \frac{6}{8} \times \frac{8}{2} = \frac{48}{16} = 3$$

Unlike denominators:

$$\frac{6}{8} \div \frac{3}{5} = \frac{6}{8} \times \frac{5}{3} = \frac{30}{24} = 1\frac{6}{24} = 1\frac{1}{4}$$

Dividing with models
(unlike denominators)



$$\frac{5}{8} \div \frac{1}{4} = 2\frac{1}{2}$$

Dividing mixed numbers

Like denominators:

$$\begin{aligned} 2\frac{3}{8} \div \frac{3}{8} &= \frac{19}{8} \div \frac{3}{8} = \frac{19}{8} \times \frac{8}{3} \\ &= \frac{152}{24} = 6\frac{8}{24} = 6\frac{1}{3} \end{aligned}$$

Unlike denominators:

$$\begin{aligned} 3\frac{5}{8} \div \frac{2}{3} &= \frac{29}{8} \div \frac{2}{3} = \frac{29}{8} \times \frac{3}{2} \\ &= \frac{87}{16} = 5\frac{7}{16} \end{aligned}$$

Understand Fraction Division

Dividing fractions with the same denominator is equivalent to dividing the numerators.

$$\frac{a}{b} \div \frac{c}{b} = \frac{a \div c}{b \div b} = \frac{a \div c}{1} = a \div c \text{ or } \frac{a}{c}$$

When dividing fractions with the same denominator you can simply write a new fraction using the information given in the problem:

$$\frac{\text{numerator of dividend}}{\text{numerator of divisor}}$$

A cookie recipe calls for $\frac{1}{8}$ cup of butter. If Amy has $\frac{7}{8}$ cup of butter, how many batches of cookies can she make?

A. Write a model for the problem.

$$\frac{7}{8} \div \frac{1}{8}$$

B. Identify the numerators in each fraction.

numerator of dividend = 7

numerator of divisor = 1

C. Write a new fraction.

$$\frac{\text{numerator of dividend}}{\text{numerator of divisor}} = \frac{7}{1}$$

D. Simplify.

$$\frac{7}{1} = 7$$

E. State your answer.

Amy can make 7 batches of cookies with $\frac{7}{8}$ cups of butter.

Divide the fractions by dividing the numerators.

- 1.** Raymond wants to run $\frac{15}{16}$ mile after school. The school's track is $\frac{3}{16}$ mile long. How many laps around the track will Raymond have to run?

2. $\frac{1}{5} \div \frac{3}{5}$

3. $\frac{3}{8} \div \frac{1}{8}$

4. $\frac{7}{9} \div \frac{2}{9}$

5. $\frac{15}{16} \div \frac{3}{16}$

6. $\frac{3}{11} \div \frac{5}{11}$

7. $\frac{1}{12} \div \frac{11}{12}$

Explore Division of Fractions with Unlike Denominators

One way to solve a problem involving the division of fractions with unlike denominators is to rewrite the problem as a multiplication problem by using the **multiplicative inverse** of the divisor.

Two numbers are **reciprocals** of each other if, when multiplied, their product is 1.

For example, $\frac{8}{5}$ is the reciprocal of $\frac{5}{8}$ because:

$$\frac{8}{5} \bullet \frac{5}{8} = \frac{40}{40} = 1$$

In general terms, the rule for the division of fractions with unlike denominators is:

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \bullet \frac{d}{c}$$

Using Reciprocal Numbers

Dividing by a fraction:

$$\frac{3}{8} \div \frac{3}{4} = \frac{3 \div 3}{8 \div 4} = \frac{1}{2}$$

is the equivalent to multiplying by its reciprocal:

$$\frac{3}{8} \bullet \frac{4}{3} = \frac{3 \bullet 4}{8 \bullet 3} = \frac{12}{24} = \frac{1}{2}$$

Maria needs to measure out $\frac{2}{5}$ liter of broth for a recipe. If she only has a container that holds $\frac{1}{10}$ liter, how many containers will she need to fill?

A. Write a model to represent the situation.

$$\frac{2}{5} \div \frac{1}{10}$$

B. Identify the reciprocal of the divisor.

The reciprocal of $\frac{1}{10} = \frac{10}{1}$.

C. Rewrite the division problem as a multiplication problem using the reciprocal. Solve and simplify.

$$\frac{2}{5} \bullet \frac{10}{1} = \frac{20}{5} = 4$$

D. State your answer.

Maria will need to fill 4 containers.

Divide the fractions by multiplying by the reciprocal of the divisor.

- 1.** Raymond is making stir-fry rice for dinner. The recipe says to add $\frac{3}{4}$ tablespoon of ground ginger, but he only has a $\frac{1}{8}$ tablespoon measuring spoon. How many measuring spoons of ginger should he add?

2. $\frac{5}{8} \div \frac{3}{16}$

3. $\frac{3}{5} \div \frac{21}{25}$

4. $\frac{2}{3} \div \frac{5}{6}$

5. $\frac{7}{9} \div \frac{2}{3}$

Explore Division of Mixed Numbers

One way to solve a problem involving the division of a **mixed number** is to use the multiplicative inverse strategy used to find the quotient of fractions with unlike denominators.

In order to use this strategy, each mixed number in the division problem will first have to be converted to a **fraction** greater than 1.

Then find the reciprocal of the divisor and use the multiplicative inverse strategy to solve.

Division with Mixed Numbers

$$4\frac{3}{8} \div 1\frac{3}{4}$$

Convert each mixed number into an improper fraction.

$$\frac{35}{8} \div \frac{7}{4}$$

Use the multiplicative inverse strategy to solve.

$$\frac{35}{8} \cdot \frac{4}{7} = \frac{5}{2} = 2\frac{1}{2}$$

Vanessa runs $3\frac{3}{4}$ miles in $30\frac{1}{2}$ minutes. What is Vanessa's average time per mile?

A. Write an expression to represent the situation.

$$30\frac{1}{2} \div 3\frac{3}{4}$$

B. Convert each mixed number into an improper fraction.

$$30\frac{1}{2} = \frac{61}{2}; 3\frac{3}{4} = \frac{15}{4}$$

C. Identify the reciprocal of the divisor.

$$\text{The reciprocal of } \frac{15}{4} = \frac{4}{15}.$$

D. Rewrite the division problem as a multiplication problem using the reciprocal. Solve and simplify.

$$\frac{61}{2} \cdot \frac{4}{15} = \frac{244}{30} = 8\frac{2}{15}$$

E. State your answer.

Vanessa averaged $8\frac{2}{15}$ minutes per mile.

Divide by multiplying by the reciprocal of the divisor.

1. Sky volunteers at the local animal shelter. Each dog eats $\frac{1}{2}$ lb of food at each meal. If dog food comes in bags of $20\frac{1}{2}$ lbs, how many dogs can Sky feed from one bag of dog food?
- _____

Divide by multiplying by the reciprocal of the divisor.

2. $3\frac{5}{8} \div \frac{3}{4}$ _____

3. $1\frac{3}{5} \div \frac{2}{3}$ _____

4. $1\frac{2}{3} \div \frac{5}{6}$ _____

5. $5\frac{7}{9} \div 1\frac{2}{3}$ _____

Practice and Apply Division of Fractions and Mixed Numbers

When dividing fractions or mixed numbers by a whole number, you must first write the whole number as a fraction. Then you can use the multiplicative inverse strategy used when dividing by fractions.

The reciprocal of the whole number is a fraction with a numerator of 1 and a denominator of the whole number.

For example, $\frac{1}{4}$ is the reciprocal of 4 because: $\frac{1}{4} \bullet \frac{4}{1} = \frac{4}{4} = 1$

At a health food store, a bulk bag of rice that weighs $62\frac{2}{5}$ lbs. is to be divided into 24 smaller bags. How much rice will go in each bag?

- | | |
|--|---|
| A. Write a model to represent the situation. | $62\frac{2}{5} \div 24$ |
| B. Convert the mixed number into an improper fraction. Write the whole number as a fraction. | $62\frac{2}{5} = \frac{312}{5}; 24 = \frac{24}{1}$ |
| C. Identify the reciprocal of the divisor. | The reciprocal of $\frac{24}{1} = \frac{1}{24}$. |
| D. Rewrite the division problem as a multiplication problem using the reciprocal. Solve and simplify. | $\frac{312}{5} \bullet \frac{1}{24} = \frac{312}{120} = 2\frac{3}{5}$ |
| E. State your answer. | $2\frac{3}{5}$ lbs. of rice in each bag |

Divide.

- 1.** The area of a rectangular patio is $87\frac{1}{8}$ square feet. The length of the patio is $8\frac{1}{2}$ feet. What is the width of the patio?

2. $9\frac{5}{8} \div 1\frac{3}{4}$

3. $4\frac{3}{5} \div \frac{1}{4}$

4. $33\frac{2}{3} \div \frac{5}{6}$

5. $5\frac{8}{9} \div 2$

6. $1\frac{2}{3} \div \frac{1}{6}$

7. $4\frac{1}{10} \div \frac{2}{5}$

Practice Fraction Operations

In order to add and subtract fractions, both fractions must have a common denominator.

$$\frac{2}{3} + \frac{1}{4}$$

1. Find the **least common multiple** of the denominators. This is known as the **least common denominator**.
2. Multiply both the numerator and the denominator in each fraction by the same number to convert each fraction to an equivalent fraction with the least common denominator.

$$\frac{2}{3} \bullet \frac{4}{4} = \frac{8}{12} \quad | \quad \frac{1}{4} \bullet \frac{3}{3} = \frac{3}{12}$$

3. Add or subtract the fractions.

$$\frac{8}{12} + \frac{3}{12} = \frac{11}{12}$$

Least Common Multiple

The least common multiple is the smallest multiple two or more numbers have in common.

Multiples of 3

3, 6, 9, **12**, 15, 18, . . .

Multiples of 4

4, 8, **12**, 16, 20, . . .

The least common multiple of 3 and 4 is 12.

Megan bought $3\frac{5}{6}$ cups of green glitter and $2\frac{1}{4}$ cups of red glitter. How much glitter did Megan buy altogether?

- A. Write a model to represent the situation.
- B. Find the least common multiple of the denominators.
- C. Convert each fraction to an equivalent fraction with the least common denominator.
- D. Rewrite the problem. Solve and simplify.
- E. State your answer.

$$3\frac{5}{6} + 2\frac{1}{4}$$

The least common multiple of 6 and 4 is 12.

$$\frac{5}{6} \bullet \frac{2}{2} = \frac{10}{12} \quad | \quad \frac{1}{4} \bullet \frac{3}{3} = \frac{3}{12}$$

$$3\frac{10}{12} + 2\frac{3}{12} = 5\frac{13}{12} = 6\frac{1}{12}$$

Megan bought $6\frac{1}{12}$ cups of glitter altogether.

Perform the given operation.

1. $3\frac{5}{8} - 1\frac{3}{4}$ _____

2. $3\frac{5}{8} \bullet 1\frac{3}{4}$ _____

3. $3\frac{5}{8} \div 1\frac{3}{4}$ _____

4. $3\frac{5}{8} + 1\frac{3}{4}$ _____

School Home Letter

Module 4: Fluency with Multi-Digit Decimal Operations

Dear Family,

During the next 5 school days, we will be learning how to add, subtract, and multiply multi-digit decimals and how to divide multi-digit whole numbers and decimals.

Along the way, ask about these concepts. When students explain or show how to solve a problem, it helps them make sense of the mathematics and deepens their understanding. Go to the *Family Resources* and use digital resources with your child to learn together.

Lesson	Family Resources Online Support
4.1 Add and Subtract Multi-Digit Decimals	More Practice/Homework, Problem 5, Math on the Spot Video
4.2 Multiply Multi-Digit Decimals	More Practice/Homework, Problem 5, Math on the Spot Video
4.3 Divide Multi-Digit Whole Numbers	More Practice/Homework, Problem 5, Math on the Spot Video
4.4 Divide Multi-Digit Decimals	More Practice/Homework, Problem 6, Math on the Spot Video
4.5 Apply Operations with Multi-Digit Decimals	More Practice/Homework, Problem 7, Math on the Spot Video

Home Activity

A trip to the gas station offers a wonderful opportunity to practice decimal operations. The next time you stop to get gas, compare the prices of the different grades of gasoline. When you finish filling up, calculate how much your gasoline would have cost if you had purchased a different grade. How much did you save or could you have saved by using a less expensive grade?

Carta a la familia

Módulo 4: Fluidez con las operaciones decimales de varios dígitos

Estimada familia:

Durante los próximos 5 días escolares, aprenderemos a sumar, restar y multiplicar números decimales de varios dígitos y a dividir números enteros y decimales de varios dígitos.

En ese tiempo, pregunten acerca de estos conceptos. Cuando los estudiantes explican o muestran cómo resolver un problema, les ayuda a encontrarles sentido a las matemáticas y a profundizar su comprensión. Ingrese en *Recursos familiares* y utilice los recursos digitales con su hijo(a) para estudiar juntos.

Lección	Apoyo en línea para recursos familiares
4.1 Suma y resta decimales de varios dígitos	Más práctica/Tarea, Problema 5, Video de Matemáticas al instante
4.2 Multiplica decimales de varios dígitos	Más práctica/Tarea, Problema 5, Video de Matemáticas al instante
4.3 Divide números enteros de varios dígitos	Más práctica/Tarea, Problema 5, Video de Matemáticas al instante
4.4 Divide decimales de varios dígitos	Más práctica/Tarea, Problema 6, Video de Matemáticas al instante
4.5 Aplica operaciones con decimales de varios dígitos	Más práctica/Tarea, Problema 7, Video de Matemáticas al instante

Actividad para la casa

Aproveche un viaje a la gasolinera para practicar las operaciones con números decimales. La próxima vez que se detenga para comprar gasolina, compare los precios de los diferentes tipos de gasolina. Cuando termine de cargar, calcule cuánto le habría costado la gasolina si hubiese comprado un tipo diferente. ¿Cuánto ahorró o podría haber ahorrado si cargaba un tipo de gasolina menos costosa?

Fluency with Multi-Digit Decimal Operations

Add Decimals Using the Standard Algorithm

$$\begin{array}{r} 0.27 \\ + 0.41 \\ \hline 0.68 \end{array}$$

Align the decimal point and add as with whole numbers.

Subtract Decimals Using the Standard Algorithm

$$\begin{array}{r} 58.7 - 56.12 \\ \hline 2.58 \end{array}$$

Align the decimal point. Add zeros as placeholders as necessary. Subtract as with whole numbers.

Multiply Decimals Using the Standard Algorithm

First, multiply as with whole numbers.

Second, place the decimal point in the product. The number of decimal places in the product equals the number of decimal places in the factors.

$$\begin{array}{r} 1.99 \leftarrow 2 \text{ decimal places} \\ \times 3.8 \leftarrow + 1 \text{ decimal place} \\ \hline 1592 \\ + 5970 \\ \hline 7.562 \leftarrow 3 \text{ decimal places} \end{array}$$

Divide Whole Numbers Using the Standard Algorithm

$$\begin{array}{r} 6 \leftarrow \text{quotient} \\ 4 \overline{) 24} \leftarrow \text{dividend} \\ \uparrow \leftarrow \text{divisor} \\ 154 \text{ R}2 \\ 12 \overline{) 1,850} \\ \underline{-12} \\ 65 \\ \underline{-60} \\ 50 \\ \underline{-48} \\ 2 \leftarrow 2 \text{ is the remainder.} \end{array}$$

Divide Decimals Using the Standard Algorithm

When dividing by a decimal, first change the divisor to a whole number by multiplying by a power of 10.

Then multiply the dividend by the same power of 10.

$$1,152 \div 0.72$$

$$\begin{array}{r} 0.72 \overline{) 11.52} \\ 0.72 \times 100 = 72 \\ 11.52 \times 100 = 1152 \end{array} \quad \begin{array}{r} 0.72 \overline{) 11.52} \\ \uparrow \quad \uparrow \end{array} \quad \begin{array}{r} 16 \\ 72 \overline{) 1152} \\ \underline{-72} \\ 432 \\ \underline{-432} \\ 0 \end{array}$$

Add and Subtract Multi-Digit Decimals

Adding and subtracting decimals is similar to adding or subtracting whole numbers. You must first align the numbers by place value. Then add or subtract from right to left, and regroup when necessary.

When adding or subtracting decimals:

- Find or place the decimal point.
- Align the numbers by place value.
- Fill in empty spots with zeros.
- Add or subtract.
- Bring down the decimal point in your answer.

Align Numbers by Place Value

$$10.5 + 11.74$$

Rewritten with the decimal points lined up...

$$\begin{array}{r} 10.50 \\ + 11.74 \\ \hline 22.24 \end{array}$$

Kyle has \$5 to buy lunch. He buys a sandwich for \$2.49. How much money does Kyle have after buying lunch?

A. Find or place the decimal point. \$5. \$2.49 ↑ ↑	B. Align the numbers by place value. 5 – 2.49 _____	C. Fill in the empty spots with zeros. 5.00 – 2.49 _____	D. Subtract. $\begin{array}{r} 4 9 1 \\ \cancel{5} \cancel{0} 0 \\ - 2 4 9 \\ \hline 2 5 1 \end{array}$	E. Bring down the decimal point in your answer. 5.00 – 2.49 _____
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1. Tyesha rides her bike 1.025 miles from school to the library. She rides 0.74 mile from the library to her house. How far does Tyesha ride her bike?
- _____

Add or subtract.

2. $\begin{array}{r} 3.925 \\ + 2.574 \\ \hline \end{array}$

3. $\begin{array}{r} 7.53 \\ - 5.629 \\ \hline \end{array}$

4. $\begin{array}{r} 2.65 \\ + 3.018 \\ \hline \end{array}$

5. $\begin{array}{r} 9.702 \\ - 6.23 \\ \hline \end{array}$

6. $\begin{array}{r} 6.749 \\ - 3.2 \\ \hline \end{array}$

7. $\begin{array}{r} 5.7 \\ + 1.018 \\ \hline \end{array}$

Multiply Multi-Digit Decimals

An **area model** can be used to multiply multi-digit decimals. A rectangle is divided into columns and rows to represent the digits in each number. First, multiply the digits in each row by the digits in each column. Then total the products of each set of digits multiplied.

When multiplying using the area model, it's important to remember the rule for decimal notation when multiplying. First, complete the multiplication as you normally would. Then determine the total number of digits after the decimal points in the numbers you are multiplying together. Finally, place the same number of digits behind the decimal point in the product.

Area Model for Multiplying Decimals

	12.3 × 7.4		
	1	2	3
7	$7 \times 10 = 70$	$7 \times 2 = 14$	$7 \times 0.3 = 2.1$
4	$0.4 \times 10 = 4$	$0.4 \times 2 = 0.8$	$0.4 \times 0.3 = 0.12$
$70 + 14 + 2.1 + 4 + 0.8 + 0.12 = 91.02$			

Napoli worked 37.6 hours last week. He earns \$8.75 per hour. How much did Napoli earn last week?

A. Make an area model for the problem.

B. Multiply the digits in each row by the digits in each column.

C. Total the products of each set of digits multiplied.

D. State your answer.

	3	7	6
8	$8 \times 30 = 240$	$8 \times 7 = 56$	$8 \times 0.6 = 4.8$
7	$0.7 \times 30 = 21.0$	$0.7 \times 7 = 4.9$	$0.7 \times 0.6 = 0.42$
5	$0.05 \times 30 = 1.50$	$.05 \times 7 = 0.35$	$0.05 \times 0.6 = 0.030$

$$240 + 56 + 4.8 + 21.0 + 4.9 + 0.42 + 1.50 + 0.35 + 0.030 = 329.00$$

Napoli earned \$329.00 last week.

- 1.** Mia runs a 5-kilometer race (3.1 miles). If each mile, on average, takes her 8.7 minutes, what is her total time for the race?

Find the product.

2. $7.53 \times 0.2 =$

3. $0.223 \times 0.27 =$

4. $3.05 \times 5.06 =$

5. $11.06 \times 6.5 =$

Divide Multi-Digit Whole Numbers

You can use what you know about multiplication to solve multi-digit whole-number division problems by using partial-quotient division.

Begin by writing benchmark multiplication facts for the divisor. Write the 1, 2, and 10 multiplication facts. For larger divisors, you may wish to list the 100 and 1,000 facts. You may also see as you begin working the problem that additional benchmarks might be helpful.

Step 1 Write the 1, 2, and 10 multiplication facts for the divisor.

$$240 \times 1 = 240$$

$$240 \times 2 = 480$$

$$240 \times 10 = 2,400$$

Step 2 Start subtracting the largest products that you can from the dividend.

Step 3 When you can't subtract anymore, that is your remainder. Add the partial quotients to get the solution. Don't forget the remainder.

240	3,840	
—	2,400	10
	1,440	
—	480	2
	960	
—	480	2
	480	
—	480	+2
	0	16

Then examine the dividend to determine which of the benchmark multiplication facts has the greatest product that divides into the dividend. Subtract the product and write the partial quotient to the right of the problem. Continue in this manner until you have fully divided out the dividend, or until you are left with a remainder. Add up the partial quotients to get the solution. Don't forget the remainder.

Amanda is making beaded bracelets. She has 3,640 beads. If each bracelet requires 26 beads, how many bracelets can Amanda make?

A. Write benchmark multiplication facts for the divisor.

$$26 \times 1 = 26$$

$$26 \times 2 = 52$$

$$26 \times 10 = 260$$

$$26 \times 20 = 520$$

$$26 \times 100 = 2,600$$

B. Start subtracting the largest products that you can from the dividend.

C. Add up the partial quotients to get the solution.

26	3,640	
—	2,600	100
	1,040	
—	520	20
	520	
—	520	20
	0	140

D. State your answer.

140 bracelets

Estimate. Then find the quotient.

1. $2,728 \div 124$

Estimate: _____

Quotient: _____

2. $7,718 \div 227$

Estimate: _____

Quotient: _____

Divide Multi-Digit Decimals

Division with decimals is very similar to division with whole numbers. You can use several strategies to solve these problems, such as the partial-quotient method or the standard algorithm.

Before beginning division with decimals, rewrite the divisor. Move the decimal point to the right as many times as necessary until the divisor is a whole number. Count the number of places you moved the decimal point, and then move the decimal point in the dividend the same number of places.

Find the quotient

$$55.318 \div 3.4 \rightarrow$$

$$3.4 \overline{)55.318}$$

Write in standard form.

$$3.4 \overline{)55.318}$$

Move decimal point in divisor and dividend.

$$16.27$$

$$34 \overline{)553.18}$$

Keep dividing until quotient repeats or comes out evenly.

$$\begin{array}{r} -34 \\ \hline \end{array}$$

$$213$$

$$\begin{array}{r} -204 \\ \hline \end{array}$$

$$91$$

Add zeros on right of dividend as needed.

$$\begin{array}{r} -68 \\ \hline \end{array}$$

$$238$$

$$\begin{array}{r} -238 \\ \hline \end{array}$$

The quotient is 16.27.

$$0$$

Xiomara has \$24.94. She wants to buy as many stickers as she can. Each sticker costs 29¢. How many stickers can Xiomara buy?

$$0.29 \overline{)24.94}$$

$$0.29 \overline{)24.94}$$

A. Write the division problem in standard form.

$$86$$

B. Move the decimal point in the divisor and the dividend.

$$29 \overline{)2494}$$

$$\begin{array}{r} -232 \\ \hline \end{array}$$

$$174$$

C. Divide as you normally would.

$$\begin{array}{r} -174 \\ \hline \end{array}$$

$$0$$

D. State your answer.

Xiomara can buy 86 stickers.

1. Ming's family drove to see Ming's grandmother during winter vacation. They drove 763.75 miles and used 23.5 gallons of gas. How many miles per gallon did their car get?

2. The area of a rectangular patio is 474.525 square feet. If the patio is 18.5 feet wide, what is the length of the patio?

3. At a fast-food restaurant, it takes 1.75 minutes to make a deluxe hamburger. How many deluxe hamburgers can the restaurant make in 411.25 minutes?

Apply Operations with Multi-Digit Decimals**Adding and Subtracting with Decimals**

- Use the decimal points to line up the numbers by place value.
- Fill in any empty spaces with 0.
- Add or subtract.
- Bring down the decimal point in your answer.

Multiplying with Decimals

- Write the multiplication problem in standard form.
- Multiply.
- Place a decimal point in the product by counting the number of decimal digits in the factors.

Dividing with Decimals

- Write the division problem in standard form.
- Move the decimal point in the divisor and the dividend.
- Divide.

$10.5 + 11.24$

$$\begin{array}{r} 10.50 \\ + 11.24 \\ \hline 21.74 \end{array}$$

$21.74 - 11.24$

$$\begin{array}{r} 21.74 \\ - 11.24 \\ \hline 10.50 \end{array}$$

3.77×2.8

$$\begin{array}{r} 3.77 \text{ (2 decimal places)} \\ \times 2.8 \text{ (1 decimal place)} \\ \hline 3016 \\ + 754 \\ \hline 10.556 \text{ (3 decimal places)} \end{array}$$

$55.318 \div 3.4$

$$\begin{array}{r} 16.27 \\ 3.4 \overline{)55.318} \\ \underline{-34} \\ 213 \\ \underline{-204} \\ 91 \\ \underline{-68} \\ 238 \\ \underline{-238} \\ 0 \end{array}$$

A group of friends go to a movie and buy three sodas that cost \$1.29 each. How much did they pay?

A. Identify the relevant information. Know

3 sodas at \$1.29

Need to Know

how much they paid (total cost)

B. Determine the operation necessary to solve the problem.

multiplication

C. Write and evaluate an expression. $\$1.29 \times 3 = \3.87

D. State your answer.

\$3.87 for the 3 sodas

1. Jorge is scheduled to work 36 hours this week. He has already worked 27.25 hours. How many more hours does Jorge have to work this week?

2. Martin decides to order some comic books online. Each comic book costs \$8.95. Martin orders 12 comic books. How much does he spend?

3. A 64-ounce bag of rice costs \$7.68. What is the cost per ounce of the rice?
