

#### Watch Your Knowledge Grow

This is the math you'll explore in this unit. Rate your understanding to see how your knowledge grows!



I can	Before	After
Represent the values of digits in decimals through the thousandths using standard form, expanded form, and expanded notation.	0-0-0	0-0-0
Order decimals to the thousandths.	0-0-0	0-0-0
Compare and order decimals to the thousandths on a number line.	0-0-0	0-0-0
Compare decimals to the thousandths using >, <, or =.	0-0-0	0-0-0
Round decimals to the nearest whole, tenth, or hundredth.	0-0-0	0-0-0
Add and subtract decimals to the thousandths.	0-0-0	0-0-0
Represent the products of decimals to the hundredths using objects and area models.	0-0-0	0-0-0
Solve for the products of decimals to the hundredths.	0-0-0	0-0-0
Represent the quotients of decimals to the hundredths using pictorial models and area models.	0-0-0	0-0-0
Solve for the quotients of decimals to the hundredths.	0-0-0	0-0-0



# Decimal Place Value

**Unit Story:** Market Day



pzAxe/Shutterstock.com

How can you determine the winner of a race when it looks like 2 racers tied for first place?

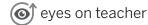
# **Explore:** Numbers Between Numbers

Is there *always* a number between 2 numbers?



Warm-Up





Discuss Where did you see math in the story?





Name

Date

You will play a game with your partner to determine if there are *always* numbers between numbers.

#### Ways to be a mathematician

I can take my time to think about a challenging problem and come up with a plan before trying to solve it.





I can see how ideas are connected and use patterns to help solve problems.

Not yet Almost I got it!



I can explain why my mathematical ideas make sense.

Not yet Almost I got it!



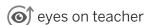
# What Is Smaller Than One Hundredth?

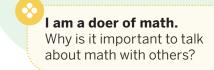
Let's make sense of decimals.



Warm-Up







Activity

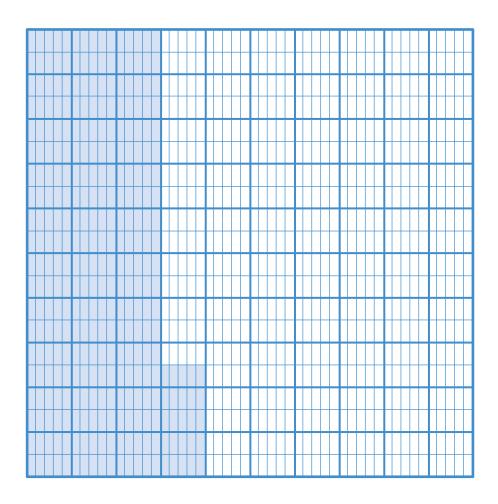
1

#### Fractions to Decimals

- 1 Work with your partner to make a poster showing what you know about each number.
  - What do you know about  $\frac{1}{10}$ ?
  - What do you know about  $\frac{1}{100}$ ?
  - What do you know about  $\frac{1}{1,000}$ ?

#### Name That Number

2 The **thousandths** model represents 1. Represent the shaded portion in as many ways as possible.



#### Summary 4.02

You can represent 1 thousandth as the fraction  $\frac{1}{1,000}$  and as the decimal 0.001. A large number of **thousandths** can be decomposed in different ways.



0.135 can be decomposed in different ways.

- 1 tenth + 3 hundredths + 5 thousandths
- 0.1 + 0.03 + 0.005
- 13 hundredths and 5 thousandths

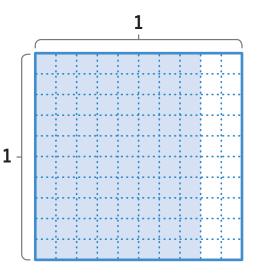
**thousandth** The base-ten place value equal to  $\frac{1}{1,000}$ . One thousandth is written as 0.001.

#### **Practice** 4.02

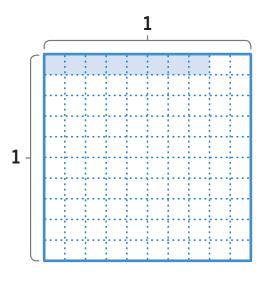
For Problems 1–3, write the fraction as a decimal.

- 1 10
- $\frac{1}{100}$
- 3 <u>1</u>,000

For Problems 4-6, represent the shaded portion as a decimal. Each whole model represents a value of 1.



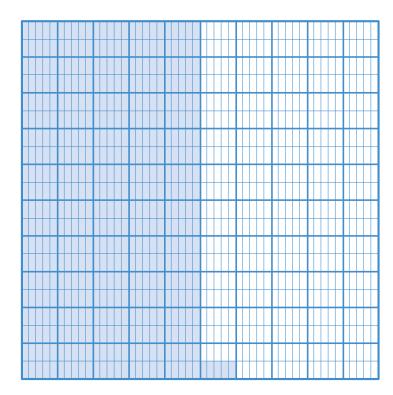
5



answer: \_

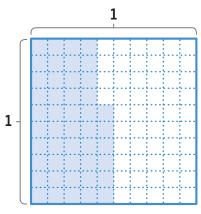
answer:

6



answer:

7 The whole model represents a value of 1.



Select all that represent the shaded region of the model.

- (A) 0.406
- **(C)** 0.460
- (E) 4 tenths and 6 hundredths
- **B**) 0.046
- $\frac{460}{1,000}$
- **F**) 46 thousandths

#### **Spiral Review**

- 8 Han has  $\frac{1}{4}$  of a jar of marbles. He shares the amount equally with his sister. How much of the jar does Han have left?
  - Record your answer in the space provided.

For Problems 9 and 10, determine the value of the unknown.

9 
$$p = [552 - (8 \times 24)] \div 9$$

**10** 
$$y = (57 + 24)6$$

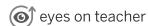
answer: \_\_\_\_\_

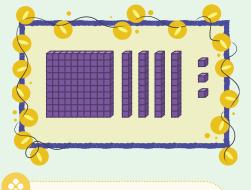
### Different Decimal Representations

Let's write decimals to the thousandths in different ways.

Warm-Up







I am a doer of math.
What is the difference
between listening to and
comparing yourself to other
mathematicians?

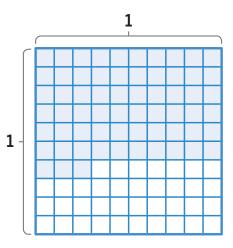
Activity

1

#### **Naming Decimals**

Name each number using words.

1



#### Naming Decimals (continued)

#### 3 Discuss (

Name

Priya and Han discussed how they would represent the number.

- Priya would represent the number as 0.08 + 0.03.
- Han would represent the number as eight hundred thirty thousandths.

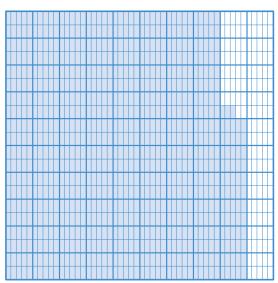
Who is correct? How do you know?



### Card Sort: Do They Have the Same Value?

#### Hands-On **#**

You and your partner will be given a set of cards. There are many ways to represent the number.



#### 4 Sort 🚺

With your partner, sort the cards into those that represent the number and those that do *not* represent the number. Record your responses in the table.

Do <i>not</i> represent the number

#### 5 Discuss

Join another pair. Take turns justifying how you sorted the cards in Problem 4. If there is disagreement, discuss until you reach an agreement.

#### Card Sort: Do They Have the Same Value? (continued)

- Which expression from the Card Sort represents the number in expanded form?
- 7 Which 3 expressions from the Card Sort represent the number in expanded notation?

Expression 1:

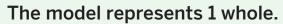
Expression 2:

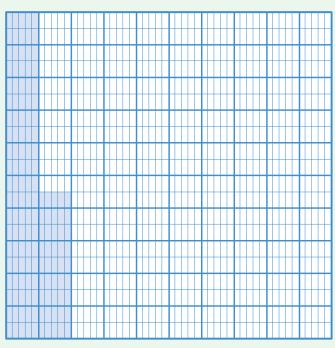
Expression 3:



#### **Summary** 4.03

You can represent a decimal in many forms, including standard form, expanded form, and expanded notation. Expanded form and expanded notation decompose a number to represent the value of each digit.





Standard form	0.145
Expanded form	0.1 + 0.04 + 0.005
Expanded notation	$(1 \times 0.1) + (4 \times 0.01) + (5 \times 0.001)$ $\left(1 \times \frac{1}{10}\right) + \left(4 \times \frac{1}{100}\right) + \left(5 \times \frac{1}{1,000}\right)$

**Practice** 4.03

1 Write 2.837 in expanded form and expanded notation.

2 Write 0.809 in expanded form and expanded notation.

3 Select all the ways to represent  $(5 \times 0.01) + (7 \times 0.001)$ .

- (A) 5 tenths and 7 hundredths
- (B) 5 hundredths and 7 thousandths

**(c)** 0.057

 $(\mathbf{D})$   $(5 \times 0.1 + 7 \times 0.01)$ 

(E) 57 hundredths

**F**) 57 thousandths

 $(\mathbf{G})$  0.05 + 0.007

(H) 0.5 + 0.07

4 Select all the ways to represent  $(7 \times 0.1) + (2 \times 0.001)$ .

- (A)  $(7 \times 0.1 + 2 \times 0.01)$
- (B) 72 hundredths

(c) 0.7 + 0.02

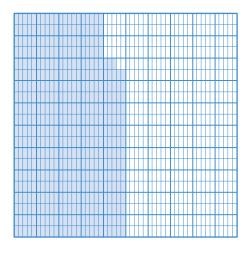
(D) 7 tenths and 2 thousandths

**E**) 0.702

- **(F)** 0.7 + 0.002
- **G** 702 thousandths
- (H) 7 tenths and 2 hundredths

5 Write 0.583 in words.

6 Write 3 different ways to represent the number shown.



#### **Spiral Review**

7 The model is shaded to represent half of a park. That half of the park will be turned into 4 new soccer fields. Which equation can be used to determine the fraction of the whole park each soccer field will be?



 $\bigcirc$   $\frac{1}{2} \div 8 = \frac{1}{16}$ 

- 8 Solve for the product using the standard algorithm.

#### **Notation and Numerals**

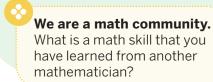
Let's represent decimals to the thousandths in different ways.



Warm-Up







Activity

1

### **Expanding Decimals**

1 Complete the table with the missing representations.

Standard form	Expanded form	Expanded notation
52.037	50 + 2 + 0.03 + 0.007	
		$(6 \times 100) + (7 \times 1) + (2 \times 0.1) + (3 \times 0.01) + (2 \times 0.001)$
	2,000 + 40 + 0.05 + 0.006	
		$(4 \times 1) + \left(5 \times \frac{1}{10}\right) + \left(2 \times \frac{1}{100}\right) + \left(7 \times \frac{1}{1,000}\right)$

#### **Equivalent Representations**

Represent the numbers in standard form, expanded form, and expanded notation.

A swimmer came in first place with a speed of thirty and five thousandths seconds.

Standard form:

**Expanded form:** 

**Expanded notation:** 

3 One of Miguel's scarves is forty-two and one hundred fifty-seven thousandths inches long.

**Standard form:** 

**Expanded form:** 

**Expanded notation:** 

4 The weight of a box of Bobbi's comic books is four and sixty-one thousandths pounds.

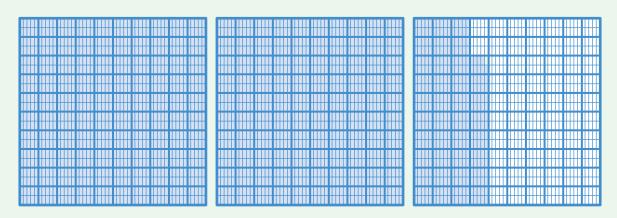
Standard form:

**Expanded form:** 

**Expanded notation:** 

#### Summary 4.04

Decimals to the thousandths can be represented in standard form, expanded form, and expanded notation. When they represent the same value, they are equivalent.



Standard form	2.379
Expanded form	2 + 0.3 + 0.07 + 0.009
Expanded notation	• $(2 \times 1) + (3 \times 0.1) + (7 \times 0.01) + (9 \times 0.001)$ • $(2 \times 1) + (3 \times \frac{1}{10}) + (7 \times \frac{1}{100}) + (9 \times \frac{1}{1,000})$

#### **Practice** 4.04

1 Consider these expressions.

$$(8 \times 10)$$

$$(4 \times 0.1)$$

$$(7 \times 0.001)$$

In which number do the digits 8, 4, and 7 have the same values as those shown in the expressions?

(A) 86.047

**B** 813.457

**(c)** 82.47

**D** 280.437

- 2 A gymnast received a score of 30.425. Represent the score in expanded notation.
- 3 The fastest runner finished a race seventy-six thousandths of a second faster than the runner in second place. Represent the time in standard form, expanded form, and expanded notation.

Standard form:	
Expanded form:	
Expanded notation:	

4 The table shows decimals and expanded notation. Choose the decimals that are correctly represented in expanded notation.

Select **THREE** correct answers.

Decimal	Expanded notation
<u> </u>	$(4 \times 10) + (2 \times 1) + (7 \times 0.1) + (6 \times 0.01)$
O 8.174	$(8 \times 1) + (1 \times 0.1) + (7 \times 0.01) + (4 \times 0.001)$
300.009	(3 × 100) + (9 × 0.001)
O 92.012	$(9 \times 10) + (2 \times 1) + (1 \times 0.1) + (2 \times 0.01)$
0.485	$(4 \times 0.1) + (8 \times 0.01) + (5 \times 0.001)$

5 Write 500 + 20 + 0.6 + 0.008 in standard form.

#### **Spiral Review**

- 6 Jonathan sells his 100-piece puzzles for \$3 each and his 1,000-piece puzzles for \$6 each.
  - At the beginning of the day, Jonathan started with some money from previous sales.
  - He sold sixteen 100-piece puzzles and seven 1,000-piece puzzles.
  - He purchased a comic book from Bobbi for \$9.
  - He ended the day with \$112.

Write an equation that can be used to find m, the amount of money Jonathan had at the beginning of the day.

For Problems 7 and 8, determine the value of the unknown.

7 
$$g = 1,065 \div 15 - 3$$

8 
$$n = (14 \times 7) - 76$$

answer: \_\_\_\_\_

answer: \_

#### The Claw

Let's locate and label decimals to the thousandths on number lines.

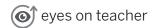


Why is it important to listen to other mathematicians in

your class?

Warm-Up





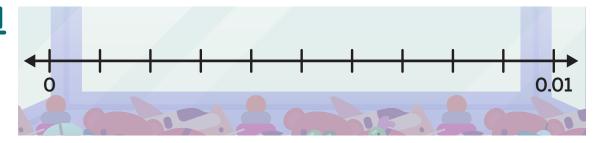
Activity

1

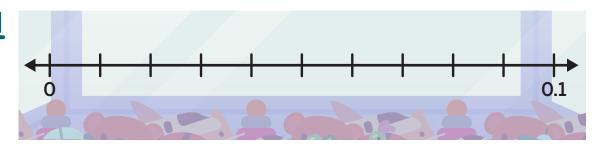
#### **Prizes at Precise Points**

Locate and label 0.001 on each number line. Be prepared to explain your thinking.

2

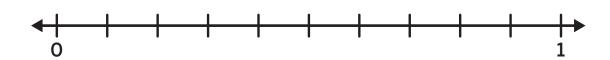


3



#### Prizes at Precise Points (continued)

Estimate and label the location of 0.001 on the number line.



Think-Pair-Share

Let's consider the location of 0.001 on Screen 4. What do you notice about the estimates?

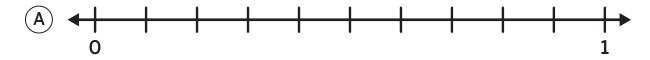
#### Bear Down

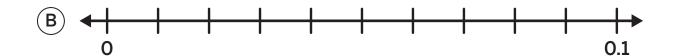
Let's consider how to locate 0.003 on the number line.

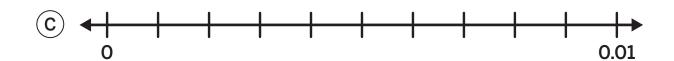
Choose the number line where each decimal can be precisely located on a tick mark. Then locate and label the decimal on the number line.

7

0.07

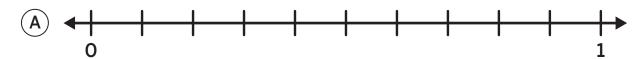


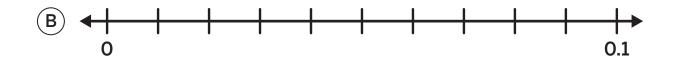


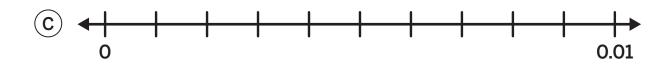


7

0.4

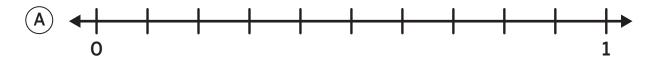


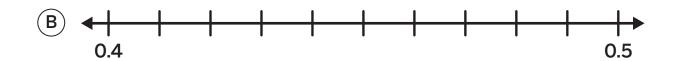


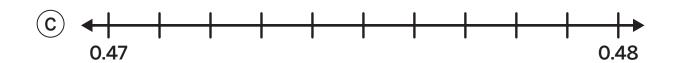


#### Bear Down (continued)

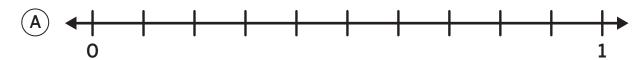
**7** 0.473

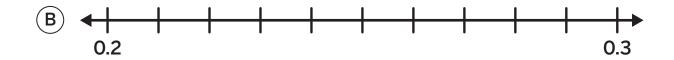


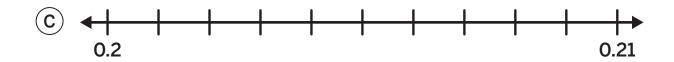




7 0.208





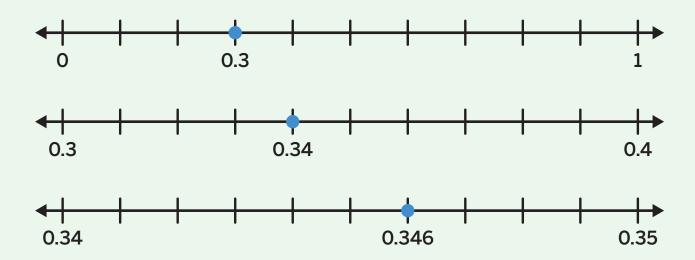


8 Discuss

Diego and Clare are locating 0.618 on a number line. Diego thinks the number is between 0.6 and 0.7. Clare thinks the number is between 0.61 and 0.62. Who do you agree with?

#### **Summary** 4.05

Place value understanding can be used to locate and label decimals to the thousandths on number lines.

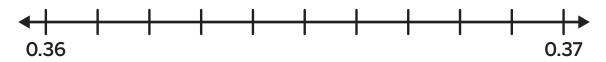


#### **Practice** 4.05

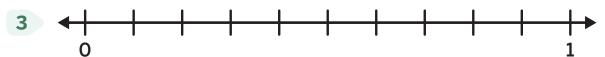
1 Locate and label 0.874 on the number line. Explain your thinking.

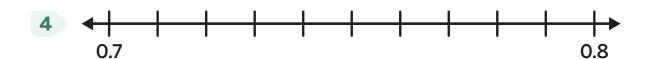


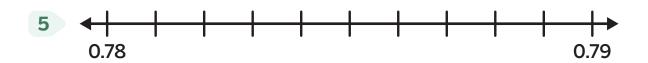
2 Locate and label 0.368.



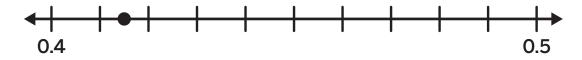
For Problems 3-5, locate and label 0.782 on the number line.







6 Which number could represent the point on the number line?



- (A) 0.45
- **B** 0.415
- **(c)** 0.401
- **D** 0.42

#### **Spiral Review**

For Problems 7 and 8, determine the product using the standard algorithm.

Show your thinking.

**7** 146 × 23

**8** 308 × 24

answer: \_\_\_\_

answer: \_\_\_\_\_

**9** Priya and her family spent  $\frac{1}{8}$ of each of the 5 days of their vacation swimming at the lake. The model is shaded to represent the amount of time Priya and her family spent swimming.

> Write an expression that represents the number of days Priya spent swimming with her family.



	K	еу		
				= 1 day

Record your answer in the space provided.

### **Selling Collectibles**

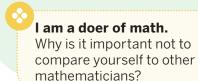
Let's compare 2 decimals using place value and the symbol <, >, or =.



Warm-Up







Activity

1

#### Collectible Miniatures

Kara creates miniatures of different dog breeds using her 3D printer. The size of the miniature determines the weight of materials needed to make that miniature.

Miniature	toy poodle	French bulldog	pug	Chihuahua	corgi	terrier	dachshund
Weight (ounces)	5.01	5.1	5.010	5.009	5.02	5.012	5.021

Write a comparison statement about the weights of the 2 dogs using <, >, or =.

- i Show or explain your thinking.
- 1 the Chihuahua and the terrier

#### Collectible Miniatures (continued)

- i Show or explain your thinking.
- 2 the corgi and the dachshund

answer: \_\_\_\_\_

3 the toy poodle and the pug

answer: \_\_\_\_\_

4 the Chihuahua and the French bulldog

answer: \_\_\_\_\_

#### 5 Discuss

Join another pair. Discuss how you compared the weights in Problems 1–4. How are your strategies similar? How are they different?

#### Introducing the Center, Greatest of Them All Decimals



**Pairs** Let's make and compare decimal numbers.

**You'll need:** Number Cards, 0–9, Recording Sheet, one per pair.



#### Set Up

- Choose who will be Player A and who will be Player B.
- Shuffle the Number Cards and place them in a stack facedown.

#### How to Play

- 1 Each player draws a Number Card and records it in one of the boxes.
- 2 Repeat until each player has a number to the thousandths place.
- Write a comparison using <, >, or =. The player with the greater number earns 1 point.
- (🍑) **How to Win** When the Recording Sheet is full, the player who earns more points wins.

CENTER Recording Sheet

Name	Data	
INAITIE	Date	

#### Greatest of Them All (continued)

Player A	Compare using <, >, or =	Player B	Winner?

#### **Summary** 4.06

Comparing decimal numbers is similar to comparing whole numbers because you compare the digits using an understanding of place value or equivalence. You can use <, >, or = to record comparison statements. When a comparison statement shows that the numbers are not equal, it is an **inequality**.

$$0.43 > 0.403 \leftarrow inequality$$

	0.43 0.403		
Place value	The digit in the tenths place is the same, so the hundredths place will determine the comparison. 3 hundredths > 0 hundredths, so, 0.43 > 0.403.		
Decimal equivalence	e 0.43 is the same as 0.430, so 0.430 > 0.403.		
Fraction equivalence	$\frac{43}{100} = \frac{430}{1,000}$ , so $\frac{430}{1,000} > \frac{403}{1,000}$		

**inequality** The name of a statement used to express the relationship between 2 unequal numbers, in which < or > symbols are used.

#### **Practice** 4.06

For Problems 1–4, write a comparison statement about the 2 decimals using <, >, or =.

1 0.654 and 0.658

i Show your thinking.

2 0.009 and 0.008

i Show your thinking.

answer: \_\_\_\_\_

**3** 0.601 and 0.61

i Show or explain your thinking.

answer: \_\_\_\_\_

**4** 1.85 and 1.849

i Show or explain your thinking. —

## The table shows the length of insects that Priya found. Use the table for Problems 5 and 6.

- 5 Which insect has the *longest* length?
  - (A) ant

- (B) beetle
- (c) cricket
- (D) grasshopper

Insect	Length (in.)
ant	0.75
beetle	0.835
cricket	0.705
grasshopper	0.955

6 Which comparison statements are true?

Select **THREE** correct answers.

Comparison statement	
0.835 > 0.955	
0.705 < 0.75	
O.955 > 0.75	
O.75 < 0.835	
0.835 < 0.705	
O.955 < 0.705	

#### **Spiral Review**

Determine the quotient using the standard algorithm.

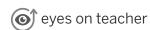
**7** 5,952 ÷ 16

# Which Way Down the Mountain?

Let's round decimals to the nearest whole, tenth, and hundredth.

Warm-Up







I am a doer of math.

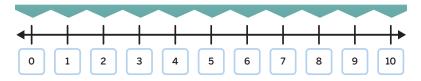
What is a math skill that took a lot of practice for you to improve? How did it feel when you improved?

**Activity** 

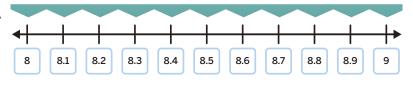
1

## **Rounding With Number Lines**

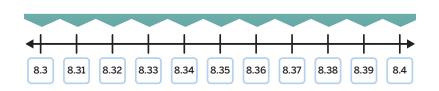
The skier will drop at 8.3.
Round to the nearest
whole number to show
where the skier will stop.



The skier will drop at 8.37. Round to the *nearest* tenth to show where the skier will stop.



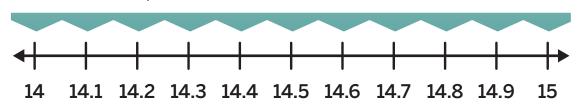
The skier will drop at 8.374. Round to the nearest hundredth to show where the skier will stop.



#### Rounding With Number Lines (continued)

### 5 Discuss

The skier will drop at 14.672. How can you determine the *nearest tenth* the skier will stop at?

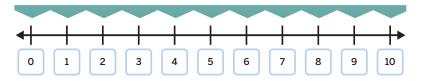


#### 6 Complete as many challenges as you can.

Round 7.33 to the nearest whole number.

Name.

\_\_\_\_



Round 14.26 to the nearest tenth.

\_\_\_\_



Round 4.243 to the nearest hundredth.

4.2 4.21 4.22 4.23 4.24 4.25 4.26 4.27 4.28 4.29 4.3

## 7 Think-Pair-Share

Let's look at 3 ways to round 8.374. What do you have to consider when rounding decimals?

## **Rounding Decimals**

Round 5.783 to the *nearest tenth*. Draw a number line to show your thinking if it is helpful.

answer: \_\_\_\_\_

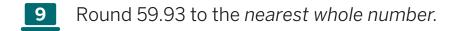
Complete as many challenges as you can. Draw a number line to show your thinking if it is helpful.

Round 5.577 to the nearest hundredth.

answer: \_\_\_\_\_

Round 35.708 to the nearest tenth.

#### Rounding Decimals (continued)



answer: \_\_\_\_\_

Round 2.842 to the nearest hundredth.

answer: \_\_\_\_\_

Round 3.06 to the nearest tenth.

answer: \_\_\_\_\_

## 10 Discuss

What strategies could you use to round 6.382 to any place value?

#### **Summary** 4.07

Similar to rounding whole numbers, you can use number lines or your understanding of which whole number, tenth, or hundredth a decimal is closer to when rounding decimals.

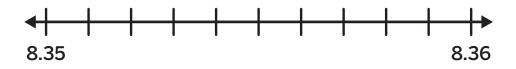
#### Round 3.468 to the . . .

Nearest whole number	3	3 3.468 4
Nearest tenth	3.5	<del>&lt;                                    </del>
Nearest hundredth	3.47	<del>&lt;                                     </del>

#### **Practice** 4.07

A \$5 gold coin weighs 8.359 grams. Use the information for Problems 1 and 2.

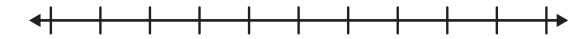
1 Locate and label 8.359 on the number line.



A scale measures to the nearest hundredth gram. What will the scale show for the weight of the coin?

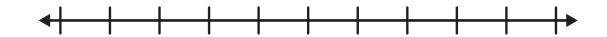
For Problems 3–5, round the decimal to the given place value. You can use the number line if it is helpful.

3 Round 12.498 to the nearest whole number.

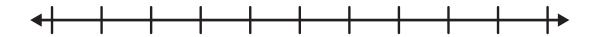


\_\_\_\_

4 Round 31.971 to the nearest tenth.



**5** Round 0.555 to the *nearest hundredth*.



6 Round 9.636 to the nearest hundredth.

Record your answer in the space provided.

#### **Spiral Review**

- 7 4 friends equally share  $\frac{1}{3}$  pounds of trail mix. How many pounds of trail mix does each friend receive?
  - i Show or explain your thinking.

answer: \_\_\_\_\_

- A runner completed 2 runs this week. The first run was 2.68 miles long. The second run was 3.18 miles long. What was the total length of both runs in miles?
  - Show your thinking. -

answer: \_\_\_\_\_

For Problems 9 and 10, determine the sum.

- i Show your thinking.
- 9 5.78 + 2.24

**10** 6.02 + 0.45

answer: \_\_\_\_\_

## **Rounding Races**

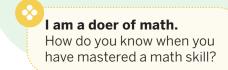
Let's use place value to round decimals to any place.



Warm-Up







Activity

1

#### Round the Times

At Games Day at Kara's school, the students' times for the 200-meter race were measured to the thousandth of a second.

1 Order the times 39.482, 37.959, and 37.062 from *least* to *greatest*.

least greatest

The table shows the times of a student who ran the 200-meter race 3 times. Round each time to the different place values shown in the table. Be prepared to explain your thinking.

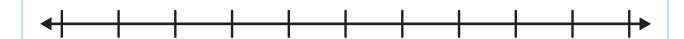
	Nearest second	Nearest tenth of a second	Nearest hundredth of a second
39.482 seconds			
37.959 seconds			
37.062 seconds			

#### Round the Times (continued)

3 Another student ran the 200-meter race and their exact finish time was measured to the thousandth of a second. Their finish time rounded to the nearest hundredth was 36.60 seconds. What are 5 possible exact finish times to the thousandth of a second? Use the number line if it is helpful.



i Show your thinking.



Time 1: \_\_\_\_\_ seconds

Time 2: \_\_\_\_\_ seconds

Time 3: \_\_\_\_\_ seconds

Time 4: \_\_\_\_\_ seconds

Time 5: \_\_\_\_\_ seconds

## Card Sort: Marching Miniatures

Kara used what she learned in the afterschool STEM lab to make her collectible miniatures move. She set up a 1-meter race between 5 of the miniatures. The table shows their finish times.



You and your partner will be given a set of cards.

Miniature	Time (seconds)
pug	28.626
toy poodle	28.532
corgi	28.708
Chihuahua	28.634
French bulldog	28.561



Use the finish times to sort the cards into 2 piles: *true* and *false*. Record the letters of the cards in the table.

True	False

#### Card Sort: Marching Miniatures (continued)

**5** Rewrite 1 false statement to make it true.

statement: \_\_\_\_\_

6 Order the miniatures' race times from fastest to slowest.

fastest slowest

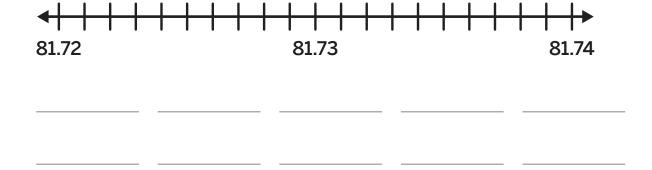
A variety of numbers round to the same number, which is why context matters and why many place values are included for certain contexts.

The table shows the times of a student who ran the 200-meter race twice.

	Nearest second	Nearest tenth of a second	Nearest hundredth of a second
48.561	49	48.6	48.56
48.596	49	48.6	48.60

#### **Practice** 4.08

Rounded to the nearest hundredth, a luge rider's fastest speed was 81.73 miles per hour. Write 10 different possible speeds that could have been the rider's fastest speed to the thousandth of a mile per hour. Use the number line if it is helpful.



2 The table shows all-around scores from a gymnastic meet. Round each score to the different place values shown in the table.

	Nearest whole number	Nearest tenth	Nearest hundredth
91.402			
91.471			
91.084			
90.975			

3 Order the scores 91.402, 91.471, 91.084, and 90.975 from greatest to least.

greatest least

4 The table shows the weights of different animals at the shelter. Which weights would be rounded to 33.8 as the nearest tenth?

Select **THREE** correct answers.

## 

 $\bigcirc$  33.885

#### **Spiral Review**

- **5** Determine the quotient 1,404 ÷ 36.
  - i Show your thinking. —

answer: \_\_\_\_\_

For Problems 6 and 7, determine the difference.

- i Show your thinking.
- **6** 3.59 1.72

**7** 10.63 – 8.49

answer: \_\_\_\_\_

## **Market Day Preparation**

Let's use what we know about adding and subtracting decimals to solve real-world problems.



Warm-Up





We are a math community. How can keeping track of information be helpful when working with others to solve a math problem?

Activity

1

#### Materials in Order

Miguel and Fiona were working together to determine the amount of fabric Miguel will have left after making 2 scarves. Miguel has 20.85 feet of fabric. One scarf will use 6.20 feet of fabric, and the other will use 7.10 feet of fabric.

Identify the difference between Miguel's and Fiona's work and explain their strategies.

$$20.85 - 6.20 = 14.65$$
  
 $14.65 - 7.10 = 7.55$   
 $7.55 \text{ feet}$ 

#### Fiona

$$6.20 + 7.10 = 13.30$$
  
 $20.85 - 13.30 = 7.55$   
 $7.55 \text{ feet}$ 

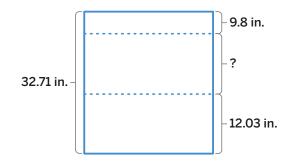
#### Materials in Order (continued)

- 2 Kara had a 2 liter bottle of paint. She put 0.59 liters of paint in one container and 0.82 liters of paint in a second container. How many liters of paint remained in the bottle?
  - i Show your thinking.

answer: \_\_\_\_\_

3 Bobbi cut paper to make a poster for Market Day. The image shows the lengths of the top and bottom of the poster that Bobbi cut off.

What is the length of the remaining part of the poster in inches?



i Show your thinking.

## Flexible Thinking

- Bobbi drew an image that is  $5\frac{1}{4}$  inches long on the cover of a comic book. If the cover is 13.5 inches long, what is the length of the page that remains? Represent your answer as a decimal.
  - i Show your thinking.

answer: \_\_\_\_\_

- Miguel made 2 scarves. He used 5.6 feet of yarn to make a scarf for a dog and  $3\frac{2}{10}$  feet of yarn to make a scarf for a cat. He started with 12.85 feet of yarn. How much yarn did Miguel have left over? Represent your answer as a decimal.
  - i Show your thinking.

- Jonathan measured the lengths in centimeters of 3 puzzle pieces. One measured 2.89 centimeters, the second measured  $2\frac{3}{4}$  centimeters, and the third measured 2.1 centimeters. What is the total length of the puzzle pieces in centimeters?
  - i Show your thinking.

answer: \_\_\_\_\_

7 A baker started the week with 120 cups of flour. The table shows the amount of flour the baker used each day.

Monday	Tuesday	Wednesday	Thursday	Friday
26.35 cups	$22\frac{3}{4}$ cups	$25\frac{1}{5}$ cups	19.55 cups	11.95 cups

How much flour did the baker have left at the end of the week?

i Show your thinking.

There are often different ways to solve multi-step problems to get the same result. It can be helpful to examine the information in the story problem before determining how you will evaluate. When both decimals and fractions are involved, it is helpful to determine either equivalent fractions or equivalent decimals before adding or subtracting.

Miguel made 2 scarves from 20 feet of fabric. If one scarf was 8.25 feet and the other was  $6\frac{1}{2}$  feet, how much fabric did he have left? Represent your answer as a decimal.

Subtract (decimal form)	Add then subtract (decimal form)	Subtract (fraction form)	Add then subtract (fraction form)
20 - 8.25 = 11.75 11.75 - 6.50 = 5.25 feet	8.25 + 6.50 = 14.75 20 - 14.75 = 5.25 feet	$20 - 8\frac{1}{4} = 11\frac{3}{4}$ $11\frac{3}{4} - 6\frac{2}{4} = 5\frac{1}{4}$ $5\frac{1}{4} = 5.25 \text{ feet}$	$8\frac{1}{4} + 6\frac{2}{4} = 14\frac{3}{4}$ $20 - 14\frac{3}{4} = 5\frac{1}{4}$ $5\frac{1}{4} = 5.25 \text{ feet}$

#### **Practice** 4.09

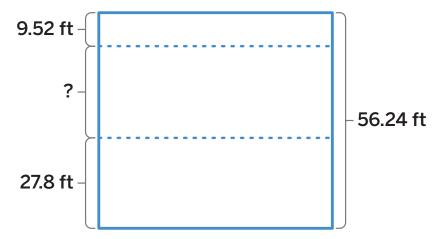
- An athlete set a goal to run 200 miles in 3 months. She ran 60.8 miles in May and 72.14 miles in June. How many miles does the athlete have to run in July to reach her goal?
  - i Show your thinking.

- 2 Shawn bought a new book. The regular price of the book is \$15.60. Shawn paid \$1.75 less than the regular price for the book. Shawn also bought a new bookmark for \$2.36. What is the total amount of money Shawn paid for the book and bookmark?
  - (A) \$19.71

(B) \$11.49

**(C)** \$16.21

- **(D)** \$12.49
- 3 An artist painted a mural on a wall. The artist painted the top of the wall and the bottom of the wall. The image shows the heights of the 2 parts of the wall that have been painted.



What is the height of the remaining part of the wall in feet?

i Show your thinking.

answer:

4 Kara wanted to see how long it would take to paint each of the miniatures. She recorded the times in the table.

Miniature	Unicorn	Goblin	Knight	Ogre
Time (min)	15.75	9 <u>1</u>	18.25	12 1/4

How long did it take Kara to paint the miniatures altogether? Represent your answer in decimal form.

Show your thinking.

answer: \_\_\_\_\_

#### **Spiral Review**

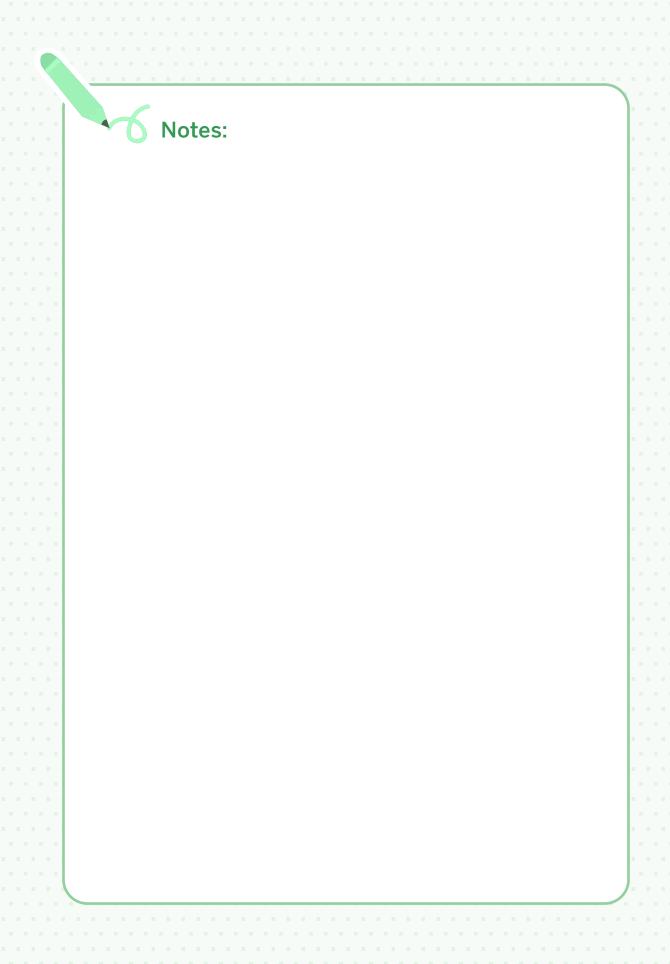
For Problems 5 and 6, determine the product.

Show your thinking.

**5** 35 × 109

**6** 246 × 61

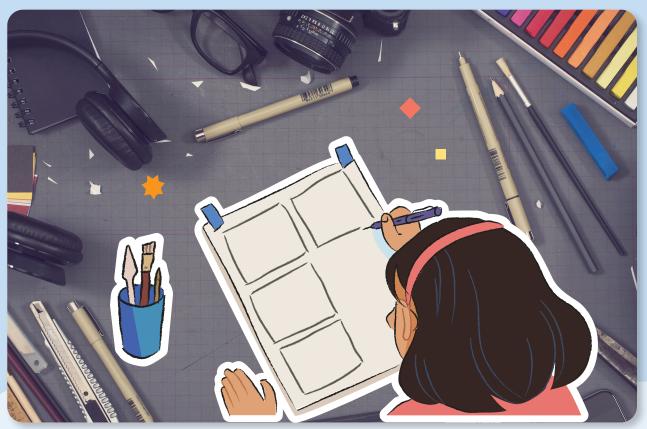
answer: \_\_\_\_\_





## **Multiplying Decimals**

Chit Story: Market Day



Twin Design/Shutterstock.com

What would you need to know to calculate how many panels are in an entire series of comic books?

**♦** TEKS 5.1.C, 5.1.D, 5.1.E, 5.3.D, 5.3.E

# **Exploring Decimal Multiplication**

Let's explore multiplying whole numbers and decimals.



**⊚** eyes on teacher

I am a doer of math.
Why is it helpful to think about how new math ideas connect to ideas you have already explored?

Warm-Up

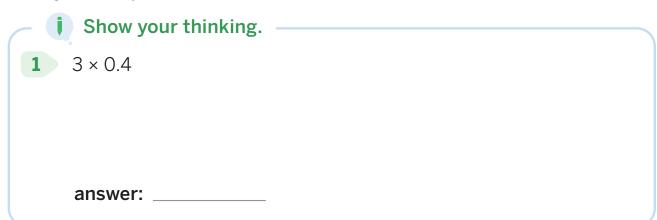
Activity **1** 

## Multiplying Whole Numbers and Decimals



You and your partner will be given a set of base-ten blocks and hundredths models.

Represent each expression using base-ten blocks. Then determine the product. You can use hundredths models to represent your thinking if they are helpful.



## Multiplying Whole Numbers and Decimals (continued)



**2** 3 × 0.04

answer: \_\_\_\_\_

answer: \_\_\_\_\_

**4** 12 × 0.02

5 At market day, Kara sold 9 miniature unicorns for \$0.70 each. How much money did she make from selling miniature unicorns?

answer: \_\_\_\_\_

answer: \_\_\_\_\_

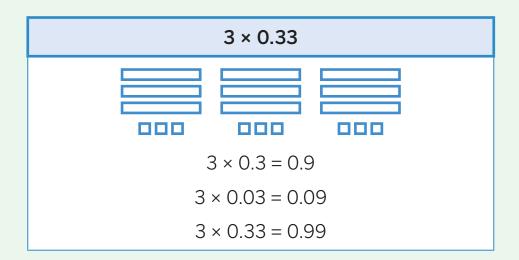
#### 6 Discuss

Join with another pair.

How are your strategies for Problems 1–5 similar? How are they different?

#### Summary 4.10

Multiplying with decimals is similar to multiplying with whole numbers. You can use base-ten blocks and models to represent your thinking.



#### **Practice** 4.10

For Problems 1 and 2, use the number bank.

# Number Bank 4.0 0.4 0.04 2.4 0.24 24

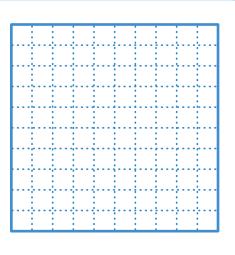
1 Make the equation true.

2 Make the equation true.

For Problems 3–5, determine the value of the expression. You can use the hundredths model to represent your thinking if it is helpful.

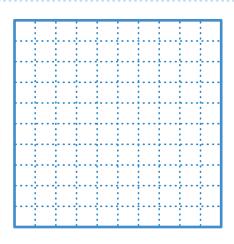
i Show your thinking.

**3** 2 × 0.5



answer: \_\_\_\_\_

**4** 2 × 0.04



**5** 6 × 0.1

answer: \_\_\_\_\_

Name \_\_\_

#### **Spiral Review**

- 6 What is the perimeter of a rectangular garden that is  $2\frac{1}{2}$  feet by  $6\frac{1}{4}$  feet?
  - i Show your thinking.

answer: \_\_\_\_\_

For Problems 7–10, determine the value of the expression.

**7** 4 × 4 \_\_\_\_\_

8 2×7 \_\_\_\_\_

**9** 35 ÷ 7 \_\_\_\_\_

**10** 15 ÷ 5 \_\_\_\_\_

# Comic Book Advertisements

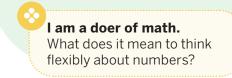
Let's multiply whole numbers and decimals.



Warm-Up







**Activity** 

1

#### Ads in Bobbi's Comic Book



You and your partner will be given base-ten blocks to represent and solve the story problems.

Bobbi planned an advertisement section for her comic book. She sold different-sized advertisements for different prices. Mr. Sawyer, the owner of Sawyer's Sensational Smoothies, bought 3 medium advertisements.

- 1 Each medium advertisement covers 0.8 square inches of space. How many square inches of space did Mr. Sawyer buy in total?
- 2 Each medium advertisement cost \$0.15. How much did Mr. Sawyer pay Bobbi?

#### Ads in Bobbi's Comic Book (continued)

- 3 Ms. Baker, the owner of Baker's Bakery, bought 3 small advertisements. Each small advertisement cost \$0.05. How much did Ms. Baker pay Bobbi?
  - i Show or explain your thinking.

Name.

answer: \_\_\_\_\_

- Ms. Dwyer, the owner of Dwyer's Discount Den, bought 1 large advertisement that is 3 inches long and 0.85 inches wide. What is the area of the large advertisement? Use any strategy to solve.
  - i Show or explain your thinking.

answer: \_\_\_\_\_

5 Discuss

Share and compare your work for Problem 4 with another pair. What is similar? What is different?

## **Extra-Large Advertisements**

Bobbi made an extra-large advertisement for Mr. Johnson, the owner of Johnson's Juice.

- 6 The advertisement was 7 inches long and 5.02 inches wide. What is the area of the advertisement in square inches?
  - Show or explain your thinking.

answer: \_\_\_\_\_

- 7 For extra-large advertisements, Bobbi decided to charge \$7.99. If Mr. Johnson buys 4 extra-large advertisements, how much will Mr. Johnson pay?
  - i Show or explain your thinking.

#### Extra-Large Advertisements (continued)

Bobbi made an extra-large advertisement for Mr. Frost, the owner of Frost's Frosties.

- 8 The advertisement was 9 inches long and 4.32 inches wide. What is the area of the advertisement in square inches?
  - Show or explain your thinking.

answer: \_\_\_\_\_

9 Discuss

Share and compare your work with your partner. What is similar? What is different?

#### Summary 4.11

You can use familiar strategies, including the associative and Distributive Properties, to multiply a whole number and a decimal.

 $5 \times 0.53$ 

Whole numbers	5 × 53	
Associative property	(5 × 53) × 0.01	
Distributive Property	(5 × 0.5) + (5 × 0.03)	

#### **Practice** 4.11

1 Match each expression with its product.

#### Expression

**a.** 
$$4 \times 0.7$$

**c.** 
$$4 \times 0.12$$

**d.** 
$$4 \times 1.02$$

2 The table shows expressions and corresponding values. Determine if each expression represents the value.

Select **THREE** correct answers.

Expression	Value
○ 8 × 0.9	7.2
○ 6 × 0.02	4.8
2 × 3.15	6.3
○ 7 × 0.3	0.21
O 9 × 1.1	9.9

- Priya found 12 nickels while walking around her neighborhood. How much money did Priya find?
  - i Show or explain your thinking.

answer: \_\_\_\_\_

- 4 5 cats each weigh 6.31 pounds. How much do the cats weigh in all?
  - i Show or explain your thinking.

#### **Spiral Review**

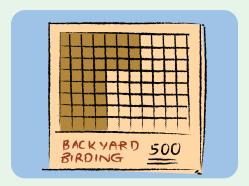
- **5** Determine the product  $532 \times 87$  using the standard algorithm.
  - i Show your thinking.

answer: \_\_\_\_\_

For Problems 6–13, determine the value of the expression.

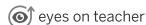
## **Model Multiplication**

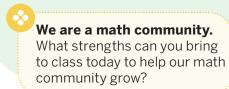
Let's represent multiplication of decimals with pictorial models.



Warm-Up







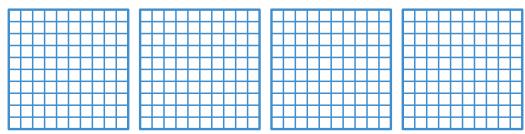
Activity

1

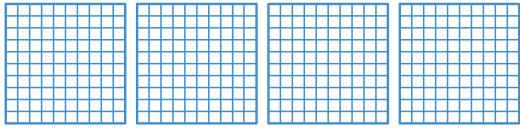
#### On the Model

Represent the expression by shading the hundredths model and circling each group of decimal factors. Then determine the product. Each model represents 1 whole.

**1** 4 × 0.15

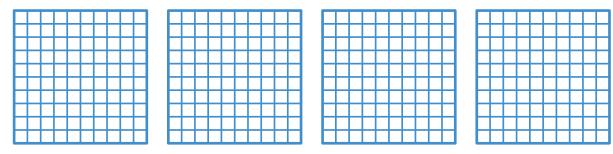


**2** 6 × 0.3

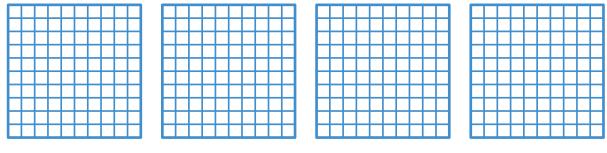


#### On the Model (continued)

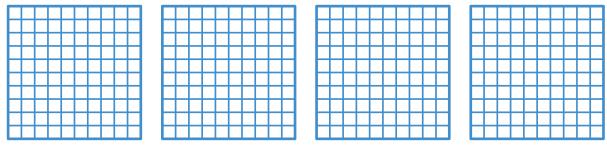
**3** 5 × 0.47



4 Miguel bought 7 price tags for his scarves. Each price tag cost \$0.38. How much money did he spend on the price tags?

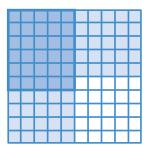


Jonathan bought 3 puzzle boxes for his puzzles. Each box cost \$1.24. What is the total cost of the puzzle boxes?



# Finding Factors, Finding Products

Fiona used the hundredths model to show  $0.5 \times 0.60$ . She thought of the expression as 0.5 of 0.60. Use Fiona's work to determine the product.



**6** 0.5 × 0.60

\_\_\_\_\_

Name.

7 Discuss

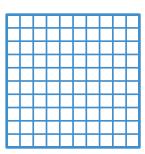
How did you determine the product? Where do you see each factor on the hundredths model?

#### Finding Factors, Finding Products (continued)

Shade each factor to determine the product. Each model represents 1 whole.

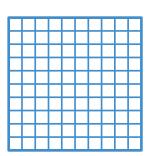
i Show your thinking.



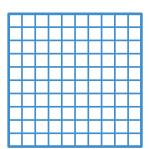


answer: \_\_\_\_\_

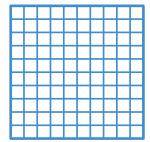




answer: \_\_\_\_\_



answer: \_\_\_\_\_

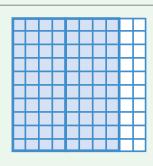


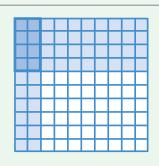
#### Summary 4.12

When multiplying a whole number by a decimal and a decimal by a decimal, representing the factors on a hundredths model can be helpful for determining the product.

$$2 \times 0.40 = 0.80$$

$$0.2 \times 0.40 = 0.08$$

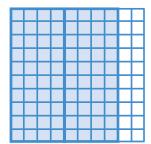




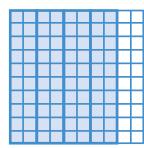
#### Practice 4.12

1 Diego bought 4 apples that cost \$0.20 each. Which model could you use to determine the cost of the apples?

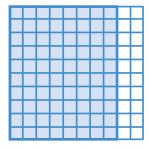
(A)



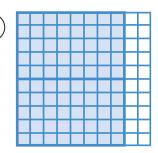
(B)



(C)



(D)

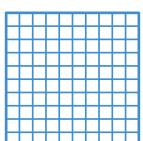


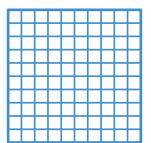
For Problems 2–5, use the hundredths model to determine the product. Each model represents 1 whole.



2 0.50 × 0.8

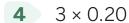
**3** 0.9 × 0.2





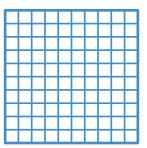
answer: \_\_\_\_\_

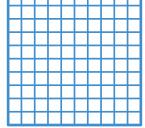
answer: \_\_\_\_\_





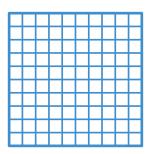
**5** 2 × 0.30



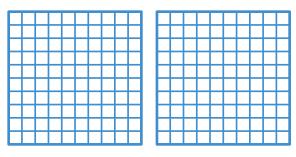


answer: \_\_\_\_\_

The rectangle represents 1 whole.



Represent the product of 0.35 and 4 by shading the model.



#### **Spiral Review**

For Problems 7 and 8, use the standard algorithm to determine the quotient.

Show your thinking.

**7** 345 ÷ 23

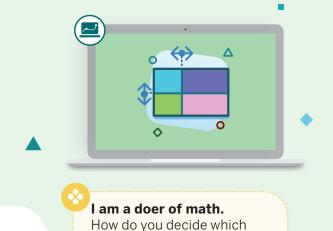
**8** 264 ÷ 12

answer: \_\_\_\_\_

answer: \_

# Decimals, Models, and Decompositions

Let's represent and solve multiplication of decimals.

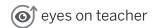


strategy to use when starting

a math problem?

Warm-Up



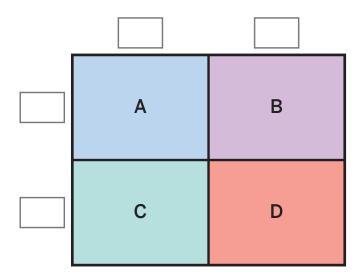


Activity

1

# **Decomposing Decimals**

Label each side length to show how you would decompose each factor to multiply  $3.4 \times 2.6$ .



Name

# Decomposing Decimals (continued)

Discuss ()

Explain why you chose to decompose the factors in this way.

Calculate the partial products of Parts A–D from the area model in Screen 2.

Part	Partial product
А	
В	
С	
D	

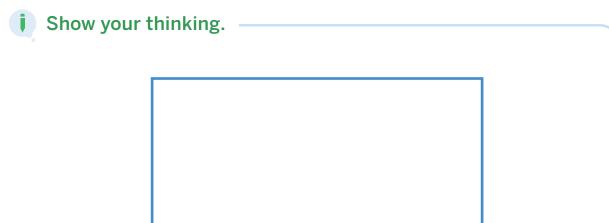
Priya created this area model to determine the product 2.7 × 1.3. Calculate each partial product.

Part	Partial product
Α	
В	
С	
D	

	2	0.7
1	A	В
0.3	С	D

#### Decomposing Decimals (continued)

Represent  $2.3 \times 1.8$  using the area model, then solve.



answer: \_\_\_\_\_

6 Discuss

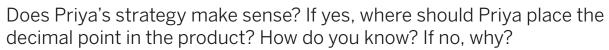
Han said  $3.2 \times 1.9 = 3.18$  because  $3 \times 1 = 3$  and  $0.2 \times 0.9 = 0.18$ . Is Han correct? How do you know?

# **Decimal Products**

Priya said she could determine the product  $2.1 \times 1.5$  by first determining the product  $21 \times 15$ .

$$\begin{array}{r}
 21 \\
 \times 15 \\
 \hline
 105 \\
 + 210 \\
 \hline
 315
\end{array}$$

Discuss (\_\_\_\_)



- 8 Determine each product.
  - i Show your thinking.

 $4.6 \times 6.4$ 

#### Decimal Products (continued)

8

i Show your thinking.

$$7.2 \times 2.5$$

answer: \_\_\_\_\_

 $8.3 \times 0.7$ 

answer: \_\_\_\_\_

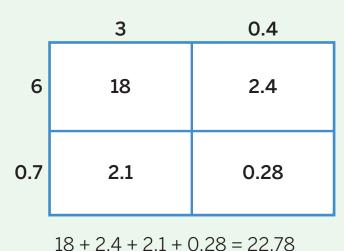
9 Explain

If  $45 \times 81 = 3,645$ , then what is the value of  $4.5 \times 8.1$ ? How do you know?

# Summary 4.13

When multiplying 2 decimals, you can decompose the factors or use what you know about whole number multiplication.





$$\begin{array}{r}
 & 2 \\
 & 34 \\
 \times & 67 \\
 \hline
 & 238 \\
 & + 2,040 \\
 & 2,278
\end{array}$$

$$3.4 \times 6.7 = 22.78$$

#### **Practice** 4.13

1 Does  $3.9 \times 7.8$  equal  $(39 \times 78) \times 0.1$ ? Explain your thinking.

- 2 Clare has a bulletin board that is 1.7 yards by 4.1 yards. If Clare wants to cover the bulletin board in decorative paper, how many square yards of paper does she need?
  - Record your answer in the space provided.

- 3 Use an area model to determine the product  $5.6 \times 3.4$ .
  - i Show your thinking.

- 4 Use an area model to determine the product  $21.5 \times 3.5$ .
  - i Show your thinking.

answer: \_\_\_\_\_

# **Spiral Review**

- **5** Determine the product  $973 \times 25$  using the standard algorithm.
  - i Show your thinking. ———

answer: \_\_\_\_\_

For Problems 6 and 7, determine the quotient.

- Show your thinking. -
- **6** 5,278 ÷ 14

**7** 8,450 ÷ 26

answer: \_\_\_\_\_



# **Dividing Decimals**

Characteristics Control of the Contr



AtlasStudio/Shutterstock.com

What would you need to know to determine the number of puzzle pieces that would fit along the top edge of a puzzle?

# **Breaking It Down!**

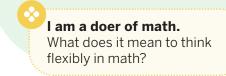
Let's represent quotients of decimals and whole numbers with base-ten blocks and models.



Warm-Up







Activity

1

# **Dividing Fabric**



You and your partner will be given a set of base-ten blocks.

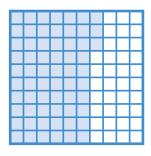
Use the base-ten blocks to represent and solve each problem.

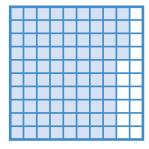
- 1 Miguel has 0.6 yards of fabric left. If he makes 2 identical scarves out of this fabric, how many yards of fabric will he use for each scarf?
- 2 Miguel wants to use 0.88 yards of fabric to make 4 cat scarves of the same size. How many yards of fabric will he need for each scarf?
- 3 There are 3.63 yards of blue fabric left. If Miguel makes 3 scarves with an equal amount of fabric, how many yards of fabric will he use for each scarf?

Grade 5 Unit 4 Lesson 14

#### Dividing Fabric (continued)

Represent the expression by shading the hundredths model and circling equal groups. Then determine the quotient.





# **Painting Miniatures**



You and your partner will be given a set of base-ten blocks.

Use the base-ten blocks to represent and solve each problem.

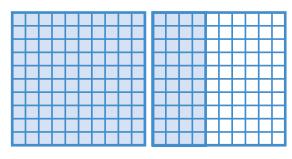
- 6 Kara has 0.9 cups of black paint to paint 2 miniature penguins. She wants to use the same amount of black paint on each penguin. How many cups of paint should she use for each penguin?
- 7 Kara has 0.75 cups of blue paint. If she uses an equal amount of blue paint on 5 miniatures, how many cups of paint will she use for each miniature?
- 8 Kara used 1.68 cups of green paint to paint 6 miniature dragons. How many cups of green paint did she use for each dragon if she used the same amount for each dragon?
- 9 Discuss

In Problem 7, how did you decompose the dividend to make an equivalent value? How did this help you solve?

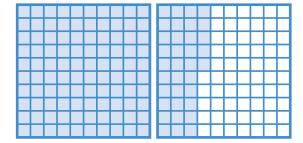
#### Painting Miniatures (continued)

Represent the expression by shading the hundredths model and circling equal groups. Then determine the quotient.

**10** 1.4 ÷ 4

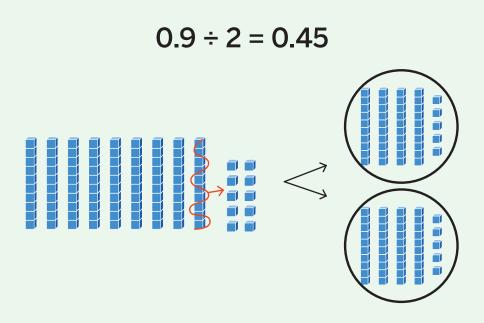


**11** 1.35 ÷ 5



#### Summary 4.14

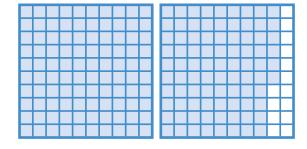
Just like whole number division, when dividing a decimal by a whole number, you can use base-ten blocks or decompose decimals into more manageable parts to determine the quotient.



#### **Practice** 4.14

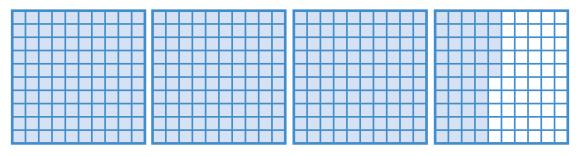
1 Use the hundredths model to determine the quotient.

$$1.86 \div 3$$

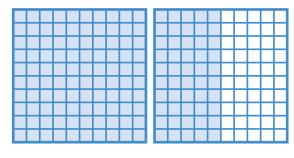


#### For Problems 2–4, use the hundredths model to determine the quotient.

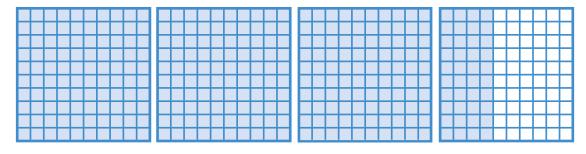
2 Clare bought a 3.45-ounce bag of popcorn. If she wants to share the popcorn equally with her and 4 friends, how many ounces of popcorn will each friend get?



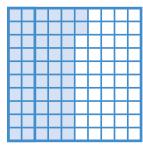
3 Diego made 6 identical bookmarks out of 1.5 sheets of paper. How many sheets of paper did he use for each bookmark?



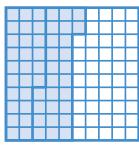
4 Priya walked 3.4 miles in 5 days. If she walked an equal amount each day, how many miles did she walk in 1 day?



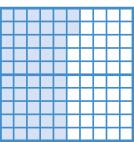
Which model represents 0.52 ÷ 2?



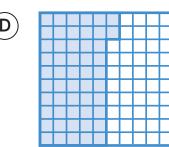
(B)



(c)



(D)



#### **Spiral Review**

- 6 Han has 3 cups of milk. He uses 1.25 cups of milk for breakfast and 0.8 cups of milk at lunch. How much milk does Han have left?
  - Show your thinking.

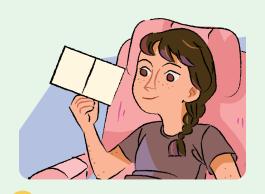
answer: \_\_\_\_\_

7 At the market there are 8 pounds of apples. A customer buys 32 ounces of apples. How many pounds of apples are left? Use the table if it is helpful.

Pounds	Ounces	
1 pound =	16 ounces	

# **Multiple Ways**

Let's represent quotients of decimals and whole numbers with area models.



Warm-Up





I can be all of me in math class.

What math ideas will you bring to class today?

Activity

1

#### Fill in the Blanks

Complete the area models to solve each problem.

A baker has 0.46 pounds of flour and wants to make 2 loaves of bread. How many pounds of flour is used in each loaf if the baker uses the same amount in each?

\_\_\_\_\_ 0.03 2 0.4 0.06

#### Fill in the Blanks (continued)

A mechanic has 0.96 quarts of oil. She divides the oil equally between 3 cars. How much oil does each car get?

3 0.9 0.06

3 At a lemonade stand, 0.84 liters of lemonade are equally poured into 4 glasses. How many liters of lemonade are in each glass?

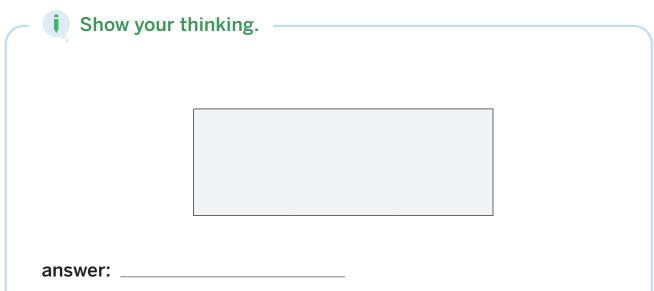
4 0.8 0.04

\_\_\_\_

#### Model It!

#### Complete the area model to solve each problem.

4 Han made \$15.50 for selling 5 friendship bracelets at the same price. What was the price of each bracelet?



- A video game company uses 84.12 megabytes to create a game. They divide the game evenly onto 4 disks. How many megabytes are on each disk?
- Show your thinking.

#### Model It! (continued)

A zookeeper has 45.75 pounds of food. The food gets equally shared between 15 elephants. How many pounds of food does each elephant get?



answer: \_\_\_\_\_

7 Clare spends her day helping customers over the phone. She spent a total of 96.63 minutes talking to 3 customers. If she spent an equal amount of time talking to each customer, how many minutes did she spend talking with 1 customer?

į :

Show your thinking.

# **Summary** 4.15

Area models are a helpful strategy for decomposing decimals to divide by whole numbers. Depending on the mathematical relationship between the numbers in the dividend and divisor, you can decompose the dividend in more than 1 way.

#### **Practice** 4.15

1 Complete the area model to determine the quotient.

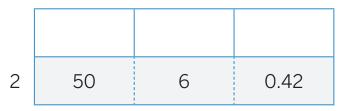
 $936.9 \div 9$ 

i Show your thinking.

For Problem 2, use the number bank.

		Numb	er Bank		
0.21	25	3	0.25	50	0.3

2 Select the correct partial quotient for each part of the area model to represent the expression 56.42 ÷ 2.



3 Han and Diego both used area models to determine the quotient of 24.39 ÷ 3. Whose area model is correct? Explain your thinking.

#### Han's Area Model

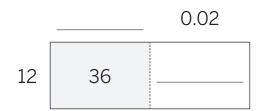
lan's Area	a Model	Die	go's Are	a Model
8	0.13	7	1	0.1

	8	0.13		7	1	0.1	0.03
3	24	0.39	3	21	3	0.3	0.09

- Priya ran for 63.77 minutes. If she ran a mile every 7 minutes, how many miles did she run?
- Show your thinking. answer: \_\_\_\_\_

**5** Complete the area model to determine the quotient.

 $36.24 \div 12$ 



**Spiral Review** 

- 6 Miguel sews together 4 pieces of fabric with a total length of 123.4 centimeters.
  - The first piece of fabric is 63.91 centimeters long.
  - The second piece of fabric is 18.2 centimeters long.
  - The fourth piece of fabric is 6.54 centimeters long.

What is the length of the third piece of fabric in centimeters?

i Show your thinking.

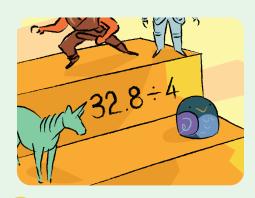
answer: \_\_\_\_\_

A coffee shop starts the day with 25 gallons of coffee. They sell 19 gallons and 2 quarts. How much coffee is left in gallons and quarts? Use the table if it is helpful.

Gallons	Quarts
1 gallon	4 quarts

# **Use What You Know**

Let's estimate and solve for quotients of decimals and whole numbers.



Warm-Up





I am a doer of math.
How can you learn from a mistake you might make when solving a math problem?

Activity

1

# **Making Connections**

- 1 Estimate the quotient 32.8 ÷ 4.
- 2 Discuss Explain how you know your estimate from Problem 1 is reasonable.
- 3 Solve for the quotient 328 ÷ 4 using any strategy.
  - i Show your thinking.

#### Making Connections (continued)

4 How can you use your responses to Problems 1 and 3 to help you determine the quotient of 32.8 ÷ 4?

- **5** Estimate and then solve for the quotient 216.3 ÷ 7 using any strategy.
  - i Show your thinking.

estimate: \_\_\_\_\_

# Your Choice!

Estimate the quotient. Then solve for the quotient using any strategy.

- **6** 64.4 ÷ 7
  - i Show your thinking.

estimate: \_\_\_\_\_

answer: \_\_\_\_\_

- **7** 56.64 ÷ 12
  - i Show your thinking. —

estimate: \_\_\_\_\_

#### Your Choice! (continued)

- **8** 259.2 ÷ 8
  - i Show your thinking. ——

estimate:

answer: \_\_\_\_\_

**9** 132.5 ÷ 25



estimate: \_\_\_\_\_

#### **Summary** 4.16

When dividing a decimal by a whole number, you can use any strategy to determine the quotient. It is important to think about the size of the quotient and where to place the decimal point. Estimating can help you determine whether the quotient is reasonable.

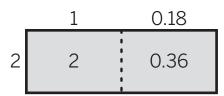
$$2.36 \div 2$$

#### **Estimating**

$$2 \div 2 = 1$$

The quotient should have a whole number in the ones place. The decimal should be placed after the whole number in the ones place.

#### Area Model



#### Whole Number Division

#### Practice 4.16

- 1 Estimate the quotient 89.45 ÷ 5. Then solve for the quotient using any strategy.
  - i Show your thinking.

estimate:

Solve for the quotient 91.98 ÷ 14.

i Record your answer in the space provided.

3 A field trip costs \$93.15 per class. If there are 23 students in each class and each student pays the same amount, how much will it cost each student to go on the field trip? Estimate the quotient. Then solve using any strategy.

Show your thinking. -

estimate: \_\_\_\_\_

**4** Estimate the quotient of the expression 45.92 ÷ 16.

5 What is the quotient of the expression from Problem 4?

(A) 2.87

**B** 28.7

**(C)** 287

**(D)** 20.87

# **Spiral Review**

A soccer game lasts 1 hour and 30 minutes. If the soccer game started at 6:15 p.m., what time did the game end?

(A) 7:15 p.m.

(B) 7:30 p.m.

**C** 7:45 p.m.

**D**) 6:45 p.m.

A customer deposited \$53.25 in the bank. Another customer deposited 50 quarters in the bank. A third customer deposited \$47.90, but received \$20.00 back in cash. How much money was deposited in the bank in all?

i Show your thinking.

# Dividing Decimals the Standard Way

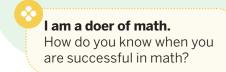
Let's use the standard algorithm to solve for quotients of decimals divided by whole numbers.



Warm-Up







Activity

1

# **Magic Decimals**

Estimate the quotient. Then solve for the quotient using the standard algorithm.

**1** 72.73 ÷ 7



Show your thinking.

estimate: \_\_\_\_\_

# Magic Decimals (continued)

**2** 23.96 ÷ 4



i Show your thinking. ——

. . . . . .

estimate: \_\_\_\_\_

answer: \_\_\_\_\_

**3** 392.8 ÷ 8



i Show your thinking.

estimate: \_\_\_\_\_

# Move It Up!

Solve for the quotient using the standard algorithm.

i Show your thinking. —

answer: \_\_\_\_\_

# Move It Up! (continued)

i Show your thinking. ——

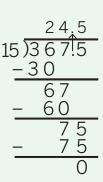
answer: \_\_\_\_\_

#### **Summary** 4.17

Using the standard algorithm to divide decimals by whole numbers helps to organize all of the partial quotients and decomposed units in an efficient way. Estimating first helps you monitor your work as you solve and check that the place value of the decimal point is accurate.

# Estimate 360 ÷ 15 = 24 Is the quotient reasonable based on the estimate? ✓ yes ☐ no

#### Standard Algorithm



#### **Practice** 4.17

- Estimate the quotient  $76.86 \div 18$ . Then solve for the quotient using the standard algorithm.
  - i Show your thinking.

estimate: \_\_\_\_\_

answer:

For Problem 2, use the number bank.

#### **Number Bank**

306

30.6

3.06

30.06

2.4

3

2 Make the equation true.

The cafeteria sells frozen yogurt on Fridays. They have 313.5 pints of frozen yogurt to sell. If there are 11 lunch groups and they want to sell an equal amount to each lunch group, how many pints of frozen yogurt can they sell to 1 lunch group? Solve using the standard algorithm.

i Show your thinking.

answer: \_\_\_\_\_

- 4 A piece of fabric measuring 4.12 yards was cut into 4 equal-sized pieces. What size is each piece of fabric?
  - (A) 103 yards

B) 1 yard

**(C)** 10.3 yards

(**D**) 1.03 yards

#### **Spiral Review**

For Problems 5 and 6, use the conversion table.

Name \_\_

Weight and Mass				
1 ton (T)	2,000 pounds (lb)			
1 pound (lb)	16 ounces (oz)			

- 5 A garbage truck collects 3 tons and 27 pounds of garbage in 1 week. How many pounds of garbage do they collect?
  - ) 3,027 pounds

**B**) 6,027 pounds

6,000 pounds

- 480 pounds
- 6 A puppy weighed 2 pounds and 4 ounces when it was first born. A month later, the puppy weighed 4 pounds and 1 ounce. How much weight did the puppy gain in pounds and ounces?
  - Show your thinking. -

answer: \_\_\_\_\_

For Problems 7–10, determine the value of the expression.

- **7** 2 0.93 \_\_\_\_\_
- **8** 3.45 1.23 \_\_\_\_\_
- **9** 11.25 0.15 **10** 0.45 0.39

