

## Family Support Materials

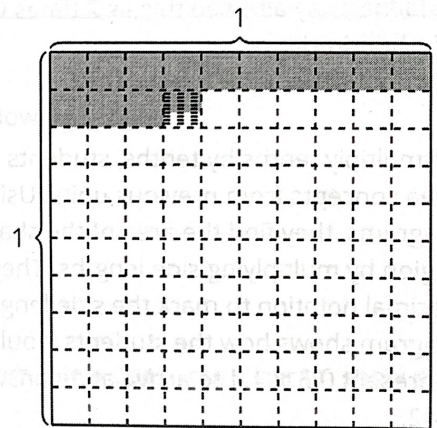
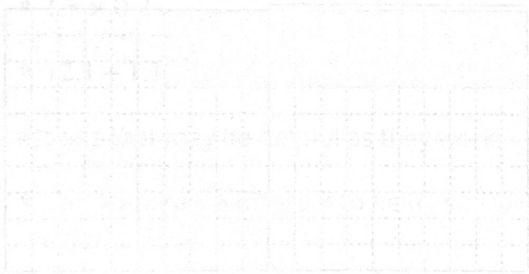
### Place Value Patterns and Decimal Operations

In this unit, students use place value understanding to round, compare, order, add, subtract, multiply, and divide decimals.

#### Section A: Numbers to Thousandths

In this section, students are introduced to the thousandths place. They represent decimals on gridded area diagrams where the large square has a value of 1, and each small square within represents  $\frac{1}{100}$ .

Students learn that if they partition each small square into ten equal parts, each of those parts represents 1 thousandth of the large square.



Students write decimals in expanded form using sums of multiplication expressions. For example, 0.124 in expanded form can be written as  $(1 \times \frac{1}{10}) + (2 \times \frac{1}{100}) + (4 \times \frac{1}{1,000})$ .

Students use this developing understanding of place value to the thousandths to locate decimals on a number line. They then use the number line to round, compare, and order decimals.

#### Section B: Add and Subtract Decimals

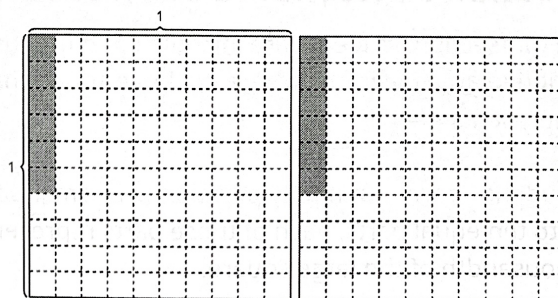
In this section, students add and subtract decimals to the hundredths. Initially, students add and subtract in ways that make sense to them. This allows students to relate addition and subtraction of decimals to operations with whole numbers. Students also use place value reasoning to estimate the value of sums and differences.

## Section C: Multiply Decimals

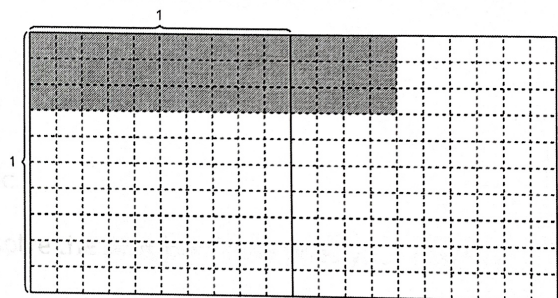
In this section, students multiply decimals with products up to hundredths. Students initially multiply decimals in ways that make sense to them. Area diagrams were used to make sense of fraction multiplication in earlier units, and they are used here as a familiar representation to make sense of decimal multiplication. They use the diagrams to relate multiplying with whole numbers to multiplying with decimals.

For example, the diagram shown can represent 2 groups of 6 hundredths, or 12 hundredths, which can be written as the equation  $2 \times 0.06 = 0.12$ .

Students may also see this as 2 times 6 groups of 1 hundredth or  $2 \times 6 \times 0.01 = 12 \times 0.01 = 0.12$ .



To multiply tenths by tenths, students revisit area concepts from previous units. Using area diagrams, they find the area of the shaded region by multiplying side lengths. They use decimal notation to mark the side lengths. The diagram shows how the students would represent  $0.3 \times 1.4$  to arrive at an answer of 0.42.

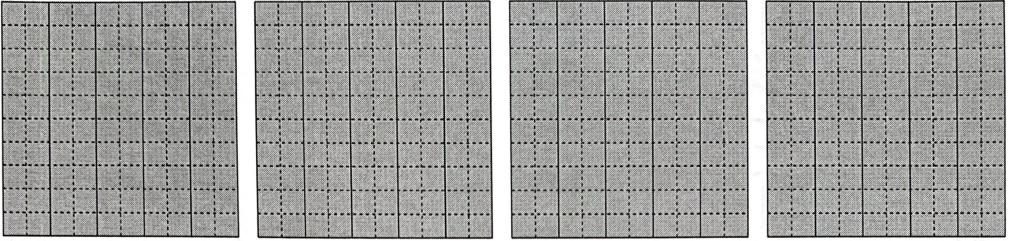


## Section D: Divide Decimals

Just as with whole numbers and fractions, students use the relationship between multiplication and division to make sense of division with decimals. In this section, students consider how many tenths or hundredths are in whole numbers (that is, 10 tenths are in 1 whole, 100 hundredths are in 1 whole). This understanding provides a foundation for students to divide a whole number by any amount of tenths or hundredths. Students learn how to use diagrams to help them solve division problems.

The example shows how students can divide 4 into groups of 2 tenths. There are 20 groups of 2 tenths in 4 wholes.

$$4 \div 0.2 = 20$$



## Try it at home!

Near the end of the unit, ask your student to solve the following problems:

- $1.8 \times 0.2$
- $12.1 \div 1.1$

Questions that may be helpful as they work:

- Can you draw a diagram to help you solve the problem? How does your diagram show the solution?
- Can you explain the steps of your algorithm?

# Showing/Representing Decimal Numbers in Different Ways/Forms

**Standard Form**  
**43, 035. 272**







**Word Form**  
Forty-three thousand, thirty-five and  
two hundred seventy-two thousandths

**Expanded Form**  
**40,000 + 3,000+30+ 5 + 0.2 + 0.07+ 0.002**

**Base Ten Form with Fraction**  
 $(4 \times \frac{10,000}{1}) + (3 \times \frac{1,000}{1}) + (3 \times \frac{10}{1}) + (5 \times 1) + (2 \times \frac{1}{10}) + (7 \times \frac{1}{100}) + (2 \times \frac{1}{1,000})$

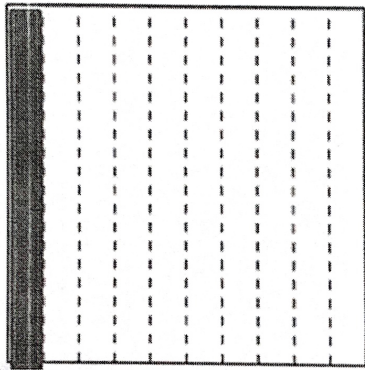
**Base Ten Form with Decimal**  
 $(4 \times 10,000) + (3 \times 1,000) + (3 \times 10) + (5 \times 1) + (2 \times 0.1) + (7 \times 0.01) + (2 \times 0.001)$

# Place Value Chart/Table

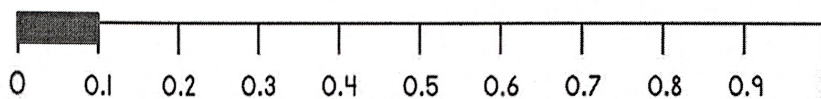
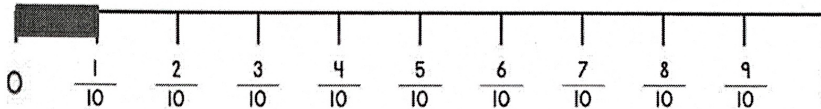
$\times 10$ (larger)				$\div 10$ (smaller)			
Thousands	Hundreds	Tens	ONES	Tenths	Hundredths	Thousandths	
1,000.	100.	10.	1.	0.1	0.01	0.001	
$\frac{1000}{1}$	$\frac{100}{1}$	$\frac{10}{1}$	$\frac{1}{1}$	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$	
\$1,000.00 	\$100.00 	\$10.00 	\$1.00 	\$0.10 	\$0.01 	\$0.001	

# Decimal Place Value

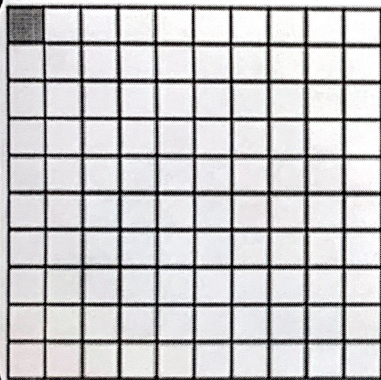
## Tenth



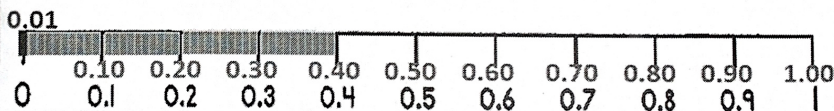
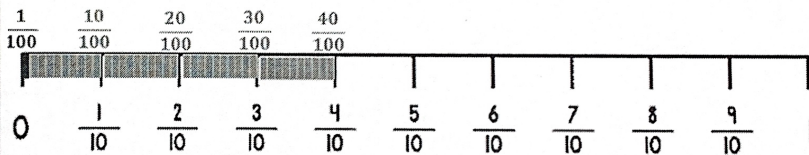
$$1 \text{ tenth} = \frac{1}{10} = 0.1 = \frac{1}{10} \text{ of } 1 = 1 \text{ dime}$$



## Hundredth



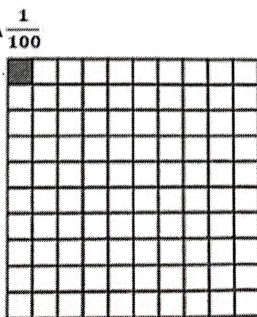
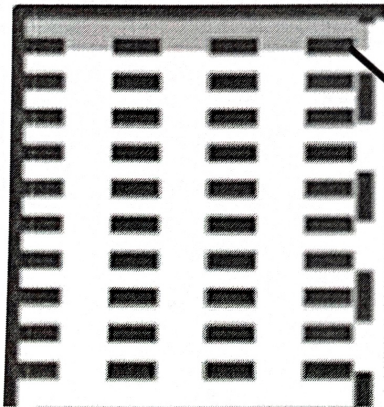
$$1 \text{ hundredth} = \frac{1}{100} = 0.01 = \frac{1}{10} \text{ of } 1 \text{ tenth} = 1 \text{ penny} = 1 \text{ cent}$$



## Thousandth

$$1 \text{ thousandth} = \frac{1}{1000} = 0.001 = \frac{1}{10} \text{ of } 1 \text{ hundredth}$$

$$= \frac{1}{10} \text{ of } 1 \text{ penny}$$



# Addition with Decimals

What to Look For in Addition with Decimals

- Check if you line up the decimal points, so like places can be added.
- It can be helpful if you draw lines to separate each place when adding.

Addition with Decimals

Example:

$$\begin{array}{r} \phantom{1,} \overset{1}{.} \phantom{333} \phantom{.} \overset{1}{.} \phantom{47} \\ 1,333.\phantom{0}8 \\ + \phantom{1,} \phantom{333} \phantom{.} \phantom{0}8 \\ \hline 1,415.\phantom{0}8 \end{array}$$

Answer: 1,415.55

Check Your Work by Doing Subtraction:

$$\begin{array}{r} \phantom{1,} \overset{3}{.} \overset{11}{.} \phantom{47} \phantom{.} \overset{4}{.} \overset{15}{.} \\ 1,415.\phantom{0}8 \\ - \phantom{1,} \phantom{415} \phantom{.} \phantom{0}8 \\ \hline 1,333.\phantom{0}8 \end{array}$$

# Subtraction with Decimals

What to Look For in Subtraction with Decimals

- Check if you line up the decimal points, so like places can be added.
- It can be helpful if you draw lines to separate each place when adding.

Subtraction with Decimals

Example:

$$\begin{array}{r} 11 \quad 10 \quad 9 \\ 1 \quad 12 \quad 11 \quad 10 \quad 14 \\ 5, \cancel{2} \cancel{2} \cancel{1} \circ \cancel{0} \cancel{4} \\ - \quad 6 \quad 7 \circ 5 \quad 9 \\ \hline 5, 1 \quad 5 \quad 3 \circ 4 \quad 5 \end{array}$$

Answer: 5, 153.45

Check Your Work by Doing Addition:

$$\begin{array}{r} 1 \quad 1 \quad 1 \quad 1 \\ 5, 1 \quad 5 \quad 3 \circ 4 \quad 5 \\ + \quad 6 \quad 7 \circ 5 \quad 9 \\ \hline 5, 2 \quad 2 \quad 1 \circ 0 \quad 4 \end{array}$$



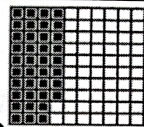
gū suàn gū jì  
估算/估计



有几个?

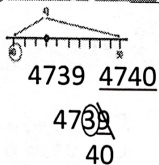
xiǎo shù

小数



0.38 =  $\frac{38}{100}$

sì shè wǔ rù  
四舍五入

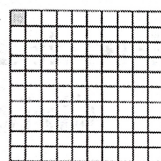


shù zì xiàn  
数字线



bǎi fēn wèi  
百分位

wǎng gé tú  
网格图

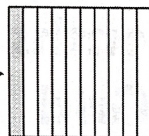


dà yú  
大于

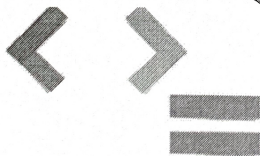
$0.22 > 0.19$   
 $0.130 > 0.129$   
 $\frac{1}{10} > \frac{2}{100}$

shí fēn wèi  
十分位

wǎng gé tú  
网格图



bǐ jiào  
比较



Estimate

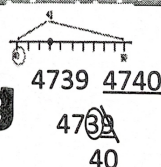


有几个?

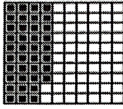
xiǎo yú  
小于

$0.22 < 0.49$   
 $0.030 < 0.129$   
 $\frac{47}{1,000} < \frac{12}{100}$

Rounding

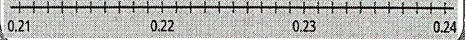


**Decimal**



→  $0.38 = \frac{38}{100}$

# Number Line



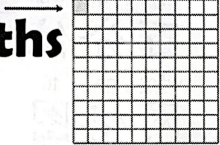
**Greater  
than**

$$0.22 > 0.19$$

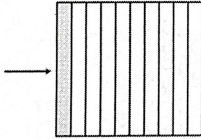
$$0.130 > 0.129$$

$$\frac{1}{10} > \frac{2}{100}$$

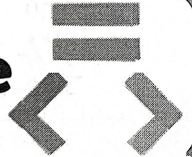
**Hundredths  
Grid**



**Tenths  
Grid**



**Compare**



**Less  
than**

$$0.22 < 0.49$$

$$0.030 < 0.129$$

$$\frac{47}{1,000} < \frac{12}{100}$$