Reveal
MATH®

Reveal the Full Potential in Every Student

Place Value and Number Relationships

Focus Question

How can I extend my knowledge of place value to understand decimals?

Hi, I'm Haley.

I want to be an astronomer. I will research comets to find how many miles they travel each second. It's important that I know how to write numbers correctly, so I can record accurate data. I will need to be able to use place value and decimals to do my job!

STEM video | GO ONLINE

Name _____

Number Lines

Consider the following numbers:

1.2   1.20   0.7   2.30   2.03   0.25   0.52   1   3.00   1.5

1. What sort of real-world situations might the above numbers represent?

_____

_____

_____

2. What do you notice about the numbers?

_____

_____

3. Rewrite each number in the list as a whole number, fraction, or mixed number.

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____

4. Estimate the location of each number on the number line below. Draw a point for each number. Write the number as a decimal above the point; write the number as a whole number, fraction, or mixed number below the point.

0   3

Generalize Place Value

Be Curious

Which doesn't belong?

3,073

5,173

70,713

Learn

What are some ways to describe the relationship between the values of the digits in the number shown?

thousands	hundreds	tens	ones
7	7	7	7

You can describe the relationship between the place-value positions.

▶ **One Way** Relate 7,000 to 700.

thousands	hundreds	tens	ones
7	7	7	7

$7,000 = 10 \times 700$

Each 7 is ten times the value of the 7 to the right.

▶ **Another Way** Relate 700 to 7,000.

thousands	hundreds	tens	ones
7	7	7	7

700 is $\frac{1}{10}$ of 7,000.

Each 7 is $\frac{1}{10}$ the value of the 7 to the left.

Math is... Structure

What ideas have we learned before that were helpful in understanding this relationship?

A digit represents 10 times as much as it represents in the place to the right. It also represents $\frac{1}{10}$ the value of what it represents in the place to its left.

Work Together

What are two different ways to describe the relationship between the values of each digit 4 in 449,035?

On My Own

Name _____

Use the place-value chart to complete the sentence.

1. The value of the 6 in the hundreds place is _____ times the value of the 6 in the _____ place.

hundred thousands	ten thousands	thousands	hundreds	tens	ones
	3	2	5	6	5
	7	3	6	1	0

Complete the sentences to describe the relationship between the values of each digit 4 and each digit 9 in the number 447,699.

2. The value of the digit 4 in the ten thousands place is _____ the value of the digit 4 in the _____ place.

3. The value of the digit 9 in the _____ place is 10 times the value of the digit 9 in the _____ place.

Is each statement *true* or *false*?

4. The digit 3 in 5,630, is 10 times the value of the digit 3 in 342.

5. The digit 3 in 5,630, is $\frac{1}{10}$ the value of the digit 3 in 342.

6. The digit 3 in 5,630, is 10 times the value of the 3 in 13.

7. The digit 3 in 5,630, is $\frac{1}{10}$ the value of the digit 3 in 13.

8. On Tuesday, 600 people attended a play at the Children's Theatre. The same play had 6,000 attendees on Saturday.

   When you compare 600 attendees to 6,000 attendees, 600 is

   _____ as much as 6,000.

9. How does the value of the 2 in the hundred thousands place relate to the value of the 2 in the ten thousands place?

hundred thousands	ten thousands	thousands	hundreds	tens	ones
2	2	9	0	3	5

10. How does the value of the 7 in the thousands place relate to the value of the 7 in the ten thousands place?

hundred thousands	ten thousands	thousands	hundreds	tens	ones
4	7	7	3	0	0

11. STEM Connection Studies show that the first observation of Halley's comet was in 466 B.C. What are two different ways to describe the relationship between the digits 6 in 466?

12. Extend Your Thinking Write a number so that the digit 5 has a value of 5,000 and is $\frac{1}{10}$ the value of the digit in the ten thousands place.

Reflect

How did I think like a mathematician today?
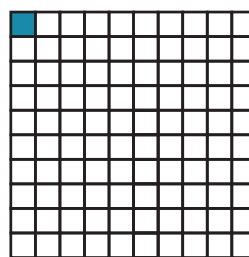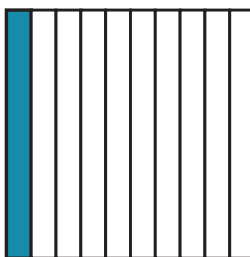
Math is... Mindset

How did you give positive feedback to your classmates today?

Extend Place Value to Decimals

Be Curious

What do you notice? What do you wonder?

Math is... **Mindset**
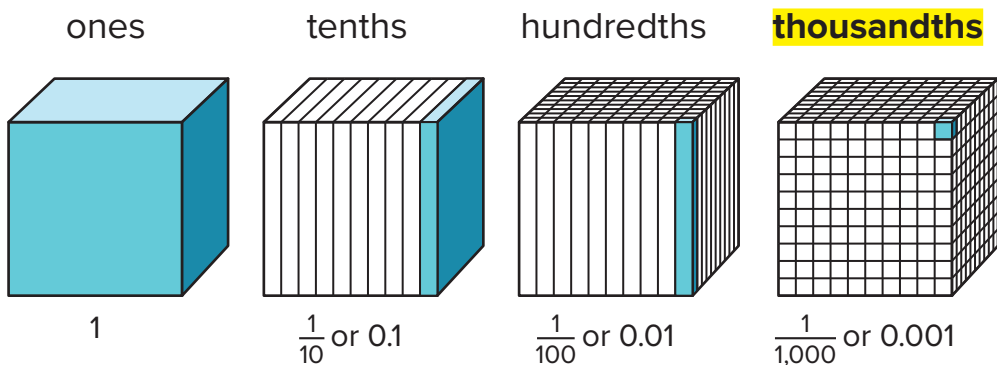
What are some ways you can avoid or manage stress?

Learn

Keagan thinks that the value of each digit 1 is the same.

How can you help Keagan make sense of this number?

ones	tenths	hundredths	thousandths
1	1	1	1

Use a representation to show the value of each digit 1.

ones	tenths	hundredths	**thousandths**
1	$\frac{1}{10}$ or 0.1	$\frac{1}{100}$ or 0.01	$\frac{1}{1,000}$ or 0.001

The value of the digit 1 depends on its position in the number.

Math is... **Patterns**

How is the name of the position related to the fractional part of the whole?

A digit in one place in a decimal number represents 10 times as much as it represents in the place to its right. It also represents $\frac{1}{10}$ the value of what it represents in the place to its left.

🗨 Work Together

What are two different ways to describe the relationship between the 0.8 and 0.08?

On My Own

Name _____

1. Which of the following statements is *true*?

    A. 0.009 is ten times 0.09

    B. 0.09 is ten times 0.009

    C. 0.09 is $\frac{1}{10}$ of 0.009

    D. 9 is $\frac{1}{10}$ of 0.9

2. Which of the following statements is *true*?

    A. 0.003 is $\frac{1}{10}$ of 0.03

    B. 0.03 is $\frac{1}{10}$ of 0.003

    C. 0.3 is ten times 0.003

    D. 3 is ten times 0.03

Marcella has \$5.00, Niko has \$0.50, and Benjamin has \$0.05. Use this information to complete each sentence.

3. Benjamin has _____ the money Niko has.

4. Marcella has _____ the money Niko has.

Complete each sentence.

5. \$9.00 is _____ \$0.90.

6. \$0.90 is _____ \$9.00.

7. What are two different ways to describe the relationship between the values of each digit 4 in 3.244?

8. What are two different ways to describe the relationship between the values of each digit 2 in 2.257?

9. **Error Analysis** Toby writes the number 23.2 and says that the value of the digit 2 in the tens place is 10 times the value of the digit 2 in the tenths place. How do you respond to him?

10. For which numbers is the value of the digit 8 ten times the value of the digit 8 in the number 4.984?

   A. 3.814

   B. 5.820

   C. 6.982

   D. 8.492

11. **STEM Connection** The world's biggest submarine can sail at a speed of about 25.5 miles per hour on the surface. How can you describe the relationship between 5 and 0.5?

12. **Extend Your Thinking** Using only the digits 1, 4, and 5, write a number so that the value of the digit 5 is ten times the value of the digit 5 in the number 1.45. Write another number so that the value of the digit 4 is $\frac{1}{10}$ the value of the digit 4 in 1.45.

Reflect

How is the relationship between the values of digits in a decimal the same as the relationship between the values of digits in a whole number?
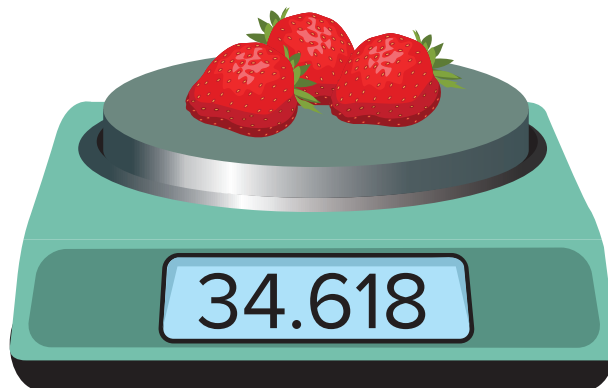
Math is... Mindset

What did you do to avoid or manage stress today?

Be Curious

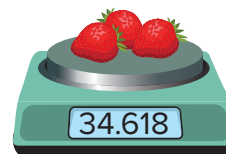### What do you notice? What do you wonder?

34.618

Math is... **Mindset**

Why is active listening important?

Learn

How can you read the mass of the strawberries?

34.618

You can use a place-value chart to help you identify the value of each digit.

Decimal numbers can be written in expanded form.

tens	ones	tenths	hundredths	thousandths
3	4	6	1	8

$$30 + 4 + 0.6 + 0.01 + 0.008$$

$$30 + 4 + \frac{6}{10} + \frac{1}{100} + \frac{8}{1,000}$$

Standard form uses digits and a decimal point.

34.618

The word form helps you read decimal numbers.

tens	ones	tenths	hundredths	thousandths
3	4	6	1	8

thirty-four and six hundred eighteen thousandths

> **Math is... Precision**
>
> Why is it important to include *and* when reading a decimal number?

Reading and writing decimal numbers follows the same patterns as reading and writing whole numbers.

💬 Work Together

Carly wrote 0.83 in expanded form using multiplication. Is her work correct? Explain your reasoning.

$$8 \times \frac{1}{10} + 3 \times \frac{1}{100}$$

On My Own

Name _____

What is the word form of the decimal?

1. 8.2

2. 8.02

3. 0.82

4. 0.082

What is the standard form of the decimal?

5. $0.9 + 0.03 + 0.007$

6. $20 + 0.7 + 0.08 + 0.006$

7. $5 + 0.01 + 0.009$

8. $7 + \dfrac{4}{10} + \dfrac{5}{1,000}$

What is each decimal in standard form?
What is each decimal in expanded form?

9. ninety-three and six thousandths

10. three and eight hundred forty-six thousandths

11. two hundred twelve and fifteen thousandths

12. seven hundred fifty-one thousandths

13. **STEM Connection** The Andromeda galaxy is 2.537 million light years from Earth. How can you write this decimal number in expanded form and in word form?

14. Kole wrote the decimal 34.821 in word form as *thirty-four eight hundred twenty-one thousandths*. Is he correct? Explain why or why not.

15. **Extend Your Thinking** Write the word forms of 321,578 and 321.578. What is the same? Explain why those similarities exist.

Reflect

How is place value used when writing decimal numbers in expanded form?

Math is... **Mindset**

What have you done to be an active listener today?

Compare Decimals

? Be Curious

How are they the same? How are they different?

3.281 kg   3.095 kg   3.9 kg

Math is... **Mindset**

How can you recognize and respond to the emotions of others?

Learn

Which bag weighs more?

3.281 kg   3.095 kg

Compare the digits in each place starting with the greatest place-value position.

ones	tenths	hundredths	thousandths
3	2	8	1
3	0	9	5

Both numbers have 3 ones.

2 tenths > 0 tenths

Math is... **Thinking**

Why was it not necessary to compare the hundredths place?

3.281 > 3.095. So, the purple bag weighs more than the red bag.

You can compare decimals the same way you compare multi-digit numbers.

Work Together

Compare the weights of these bags.

ones	tenths	hundredths	thousandths
3	2	8	1
3	9		

3.281 ◯ 3.9

3.281 kg   3.9 kg

On My Own

Name _____

**Write >, <, or = in each ◯ to make a true comparison.
You can use a place-value chart to help.**

1. 7.790 ◯ 8.7

2. 1.021 ◯ 1.095

3. 6.55 ◯ 5.66

4. 9.9 ◯ 0.99

5. 3.41 ◯ 3.41

6. 2.563 ◯ 2.573

For exercises 7–9, use the cost of each school supply.

$1.15	$1.47	$1.90
Pens	Pencils	Highlighters

7. Do the pencils or the highlighters cost more?

8. Write a comparison statement for the cost of the pens and the pencils.

9. Which school supply is the most expensive? Which school supply is the least expensive? Explain how you know.

10. **Error Analysis** An astronomer calculated that a comet traveled 192.40 kilometers. The astronomer wrote 192.4 kilometers on a chart. How do you respond to the astronomer?

11. Write a comparison statement that compares the speed of a quarter horse to the speed of a lion.

88.5 km per hour   80.5 km per hour

12. Which of the following comparisons are *true*?

    A. 0.773 > 1.773

    B. 101.020 = 101.02

    C. 0.04 < 0.4

    D. 0.321 < 0.0123

13. **Extend Your Thinking** Use the digits 5, 7, 8, and 9 to create the greatest possible decimal number.

    ☐.☐☐☐

🌀 Reflect

How is comparing decimals similar to comparing whole numbers?

Math is... Mindset

How did you recognize and respond to the emotions of others?

Comparing Decimals

Name _____

Compare the decimals by choosing $>$, $<$, or $=$.

1. 0.035 ☐ 0.35

Circle the symbol that goes in the ☐.

>   <   =

Explain or show why you chose that symbol.

---

2. 0.27 ☐ 0.235

Circle the symbol that goes in the ☐.

>   <   =

Explain or show why you chose that symbol.

3. 0.4 ☐ 0.575

Circle the symbol that goes in the ☐.

>   <   =

Explain or show why you chose that symbol.

---

4. 0.47 ☐ 0.470

Circle the symbol that goes in the ☐.

>   <   =

Explain or show why you chose that symbol.

Reflect On Your Learning

I'm confused.   I'm still learning.   I understand.   I can teach someone else.
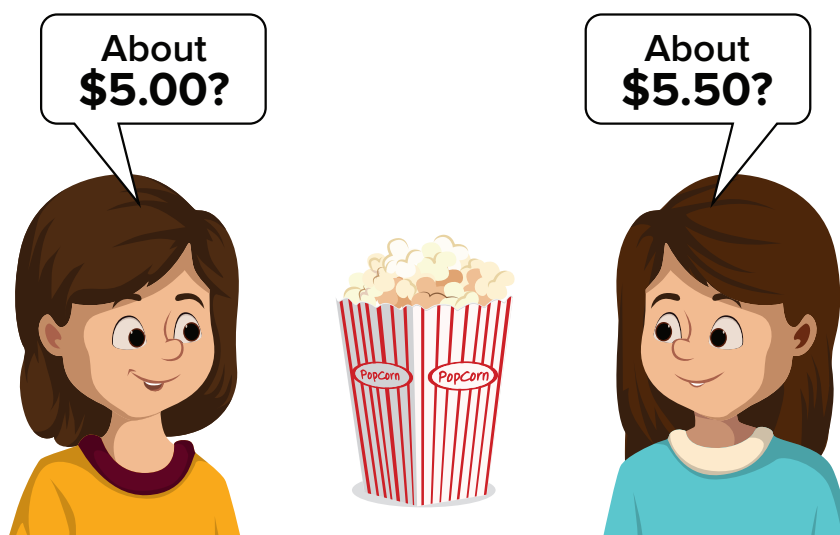
◯———◯———◯———◯

Use Place Value to Round Decimals

Be Curious

What do you notice? What do you wonder?

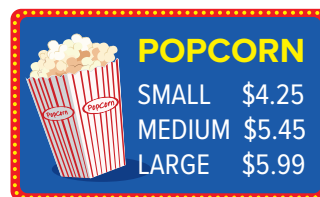About **$5.00?**

About **$5.50?**

Math is... **Mindset**

What was challenging for you?
What have you enjoyed?
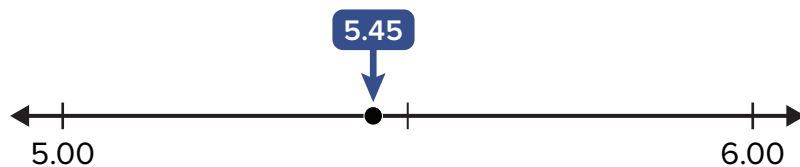
Learn

Maya and her sister want to buy a medium popcorn.

About how much money do they need?

You can round decimals to get a good estimate.

POPCORN
SMALL $4.25
MEDIUM $5.45
LARGE $5.99

▶ **One Way** Use a number line

Round to the ones.

5.45

5.00   6.00

The bag of popcorn costs about $5.00.

Math is... Precision

What do you notice about the estimate when rounding to lesser place value positions?

▶ **Another Way** Use place value

to the ones   to the tenths
**5.45**   **5.45**

5.00   **5.50**

Rounding to the nearest tenths gives a better estimate.
Maya and her sister need about $5.50 to buy a medium popcorn.

You can round decimals using number lines or place value to make reasonable estimates. Think about how precise the estimate needs to be when deciding to which place you should round to.

Work Together

What is the weight of the pumpkin rounded to the nearest whole number? nearest tenth?

8.62 lb
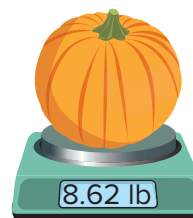
Name _____

What is each decimal rounded to the nearest whole number? You can use a number line or place value.

1. 78.39

2. 4.07

3. 12.7

4. 15.55

What is each decimal rounded to the nearest tenth? You can use a number line or place value.

5. 42.89

6. 3.65

7. 16.12

8. 98.17

9. Danica rounded a number to the nearest tenth to get 14.7. What number could she have rounded to get this answer?

10. Which statements are *true*?

    A. The decimal 43.678 rounded to the nearest tenth is 43.6.

    B. The decimal 43.678 rounded to the nearest tenth is 43.7.

    C. The decimal 43.678 rounded to the nearest hundredth is 43.68.

    D. The decimal 43.678 rounded to the nearest hundredth is 43.67.

11. The masses of five different dogs are shown. Round each mass to the nearest whole number.

22.8 kg   25.4 kg   27.1 kg   25.8 kg   26.7 kg

12. STEM Connection The mass of the sun takes up about 99.86% of the mass of our solar system. What is 99.86 rounded to the nearest tenth?

13. Which of the following numbers are closer to 100? Which are closer to 99?

99.03   99.87   99.49   99.27   99.72

14. Extend Your Thinking The price of a container of orange juice, rounded to the nearest one is $3.00. Between what two amounts could the actual price be?

🌀 Reflect

How is rounding decimals similar to rounding whole numbers?

Math is... Mindset

What have you done well today?
What did you do that helped you?

Unit Review

Name _____

Vocabulary Review

Choose the correct word(s) to complete each sentence.

decimal	tenths
place value	hundredths
decimal point	thousandths

1. A _____ is a period that separates the ones and the tenths in a decimal number. (Lesson 3-2)

2. _____ is a place value position. It represents $\frac{1}{1,000}$ of a whole. (Lesson 3-2)

3. _____ is a place value position. It represents $\frac{1}{100}$ of a whole. (Lesson 3-2)

4. The value given to a digit by its position in a number is called _____. (Lesson 3-1)

5. A number that has a digit in the tenths place, hundredths place, and beyond is called a _____. (Lesson 3-2)

6. _____ is a place value position. It represents $\frac{1}{10}$ of a whole. (Lesson 3-2)

Review

7. Which statement correctly compares values of the digit 8 in 284,560 and 128,773? (Lesson 3-1)

   A. The value of the digit 8 in 284,560 is $\frac{1}{10}$ the value of the digit 8 in 128,773.

   B. The value of the digit 8 in 284,560 is 10 times the value of the digit 8 in 128,773.

   C. The value of the digit 8 in 284,560 is 10,000 times the value of the digit 8 in 128,773.

8. Complete the sentence. (Lesson 3-3)

  In standard form, the number *thirty-six and eight hundred fourteen thousandths is written as* _____

9. Determine whether each comparison is *true* or *false*.

(Lesson 3-4)

	True	False
0.49 < 0.5		
0.304 > 0.333		
0.019 < 0.09		
0.08 > 0.81		
0.111 < 0.11		
0.68 = 0.068		

10. Complete each sentence.

(Lesson 3-5)

  0.737 rounded to the nearest hundredth is _____.

  0.737 rounded to the nearest tenth is _____.

11. Do the numbers round to 8.1 when rounded to the nearest tenth? Choose *yes* or *no*. (Lesson 3-5)

	Yes	No
7.99		
8.162		
8.074		
8.13		
8.012		

12. The table show the lengths of the tracks at Valley High School and Eastside High School. (Lesson 3-4)

School	Length of Track (in meters)
Valley H.S.	398.25
Eastside H.S.	398.09

Write a comparison using >, <, or =.

13. Which of the following statements is *true*? (Lesson 3-2)

    A. 0.002 is 10 times 0.02

    B. 0.02 is $\frac{1}{10}$ of 0.002

    C. 0.02 is 10 times 0.002

    D. 2 is $\frac{1}{10}$ of 0.2

14. Complete the sentence. (Lesson 3-2)

7 is _____ 0.7.

15. Complete the sentence. (Lesson 3-2)

0.05 is _____ 0.5.

16. Complete the expanded form of the number 8.207. (Lesson 3-3)

$8 + 2 \times \underline{\hspace{1cm}} + \underline{\hspace{1cm}} \times \frac{1}{1,000}$

17. Write the decimal number in standard form. (Lesson 3-3)

$3 \times \frac{1}{100} + 9 \times \frac{1}{1,000}$

18. Write 44.259 in word form.
(Lesson 3-3)

19. List three different decimal numbers that, when rounded to the nearest tenth, round to 3.2.
(Lesson 3-5)

20. Show two different ways to write the expanded form of the number 3.48. (Lesson 3-3)

Performance Task

There are eight planets in our solar system. Each planet orbits the sun at different speeds. Some planets have no moons and some planets have multiple moons!

PART A. The table shows length of time it takes Jupiter and Saturn to orbit the Sun in relation to Earth's orbit. Complete the table to show the word form and the expanded form of each speed.

Name	Orbit Speed (in Earth years)		
	Standard Form	Word Form	Expanded Form
Jupiter	11.86		
Saturn	29.4		

PART B. Jupiter has 67 confirmed moons. Each moon orbits at different speeds. One moon takes 259.22 Earth days to orbit Jupiter and another one takes 259.653 Earth days. Use >, <, or = to compare the orbit speeds. Explain your answer.

Reflect

Explain how place value helps you understand the relationship between decimal places.

Fluency Practice

Name _____

Fluency Strategy

You can use an **algorithm** to add. Add the digits in the same place value.

Add the ones, tens, hundreds, then thousands.

Sometimes it is necessary to regroup.

$$
\begin{array}{r}
2,431 \\
+\ 3,247 \\
\hline
5,678
\end{array}
\qquad
\begin{array}{r}
{\scriptstyle +1\ +1\ +1} \\
1,367 \\
+\ 4,856 \\
\hline
6,223
\end{array}
$$

Fluency Flash

What is the sum?

1.

thousands	hundreds	tens	ones
3	5	0	2
4	1	9	6

2.

thousands	hundreds	tens	ones
6	4	2	8
1	2	5	3

Fluency Check

What is the sum or difference?

3. $1,397 + 248 =$ _____

4. $597 - 462 =$ _____

5. $899 - 654 =$ _____

6. $12,947 + 8,126 =$ _____

7. $34,510 + 21,468 =$ _____

8. $259 + 346 =$ _____

9. $2,345 + 7,413 =$ _____

10. $219 + 684 =$ _____

11. $2,468 + 3,579 =$ _____

12. $192 + 354 =$ _____

Fluency Talk

Explain to a friend how you know if you have to regroup when adding using an algorithm.

How is adding using partial sums similar to adding using an algorithm?

Reveal MATH®

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This Student Edition Sampler demonstrates a progression of place value content from third through fifth grade.

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