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Place Value

The ★ BIG Idea
How can I use place value to read, write, compare, and order whole numbers and decimals?

Make this Foldable to help you organize information about place value.

Review Vocabulary

greater than > mayor que > An inequality relationship showing that the number on the left of the symbol is greater than the number on the right.

\[ 5 > 3 \]

5 is greater than 3

Key Vocabulary

<table>
<thead>
<tr>
<th>English</th>
<th>Español</th>
</tr>
</thead>
<tbody>
<tr>
<td>decimal</td>
<td>decimal</td>
</tr>
<tr>
<td>expanded form</td>
<td>forma desarrollada</td>
</tr>
<tr>
<td>place value</td>
<td>valor de posición</td>
</tr>
<tr>
<td>standard form</td>
<td>forma estándar</td>
</tr>
</tbody>
</table>
When Will I Use This?

Kim and Emma in Greenhouse Shopping Spree!

Let’s see, we need some soil and seeds for our classroom’s new greenhouse.

I can’t wait for things to start growing!

Wow, there are sure a lot of choices! Who knew there were so many different kinds of dirt?!!

Don’t worry, the seeds will be easier. Let’s go pick them first.

Uh-oh!

Your Turn!

You will solve this problem in the chapter.
Are You Ready for the Chapter?

You have two options for checking Prerequisite Skills for this chapter.

Text Option  Take the Quick Check below.

**QUICK Check**

Write each number in word form.

1. 8  
2. 15  
3. 23  
4. 44  
5. 160  
6. 371

Write the number that represents each point on the number line.

7. Q  
8. S  
9. R  
10. T  
11. V  
12. W

Write each sentence using the symbols <, >, or =.

13. 8 is less than 12.  
14. 25 is greater than 10.  
15. 136 is equal to 136.  
16. 471 is greater than 470.  
17. The high temperature yesterday was 64°F. The high temperature today is 70°F. Write 64 is less than 70 using symbols.

Online Option  Take the Online Readiness Quiz.
Main Idea
I will read and write whole numbers through the millions.

Vocabulary
place-value chart
period
place
place value
standard form
expanded form

Did you know that one TV game show contestant has won more than $3,620,000? There are different ways to represent this number.

You can read it as:
• three million, six hundred twenty thousand

You can write it as:
• 3 million, 620 thousand
• 3,000,000 + 600,000 + 20,000

A place-value chart shows the value of the digits in a number. In greater numbers, each group of three digits is separated by commas and is called a period.

A digit and its place, or place value, name a number. For example, in 3,620,000, the digit 2 is in the ten thousands place. Its value is $2 \times 10,000$, or 20,000.
PLACE VALUE  The graph shows how many fans attended baseball games for three teams during recent years. Use a place-value chart to show the value of each digit in 4,299,000.

<table>
<thead>
<tr>
<th>Millions</th>
<th>Thousands</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>hundreds</td>
<td>tens</td>
<td>ones</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>9</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

List the values of each digit.
4 × 1,000,000 → 4,000,000
2 × 100,000 → 200,000
9 × 10,000 → 90,000
9 × 1,000 → 9,000

The standard form of a number is the usual or common way to write a number using digits. The expanded form of a number is a way of writing a number as the sum of the values of its digits. The places with zero as a digit are not included in the expanded form.

SCIENCE  The human eye blinks an average of 5,500,000 times a year. Write 5,500,000 three ways.

Standard form: 5,500,000
Word form: five million, five hundred thousand
Expanded form: 5,000,000 + 500,000

Remember
In word form, commas separate the periods as in standard form.
Write the value of the underlined digit. See Example 1

1. 469,999
2. 1,040,710
3. 35,098,098
4. 83,023,215

Write each number in word form and expanded form. See Example 2

5. 4,562,007
6. 2,043,980
7. 6,302,806
8. 38,000,875

9. Write nine hundred thousand, five hundred fifty-two in standard form and expanded form. See Example 3

10. On Sunday, 2,617,000 newspapers were sold. Write the number of newspapers sold in word form and expanded form.

11. Explain how to find the value of the underlined digit in the number 26,057,928.
Write the value of the underlined digit.  See Example 1

12.  3,132,685  
13.  5,309,573  
14.  1,309,841  
15.  7,824,015  
16.  40,245,854  
17.  68,210,397  
18.  73,581,209  
19.  97,530,284

Write each number in word form and expanded form.  See Example 2

20.  1,429,205  
21.  7,082,009  
22.  5,901,452  
23.  8,200,013  
24.  30,842,085  
25.  63,930,053  
26.  319,999,990  
27.  800,493,301

Write each number in standard form and expanded form.  See Example 3

28.  eighty-three million, twenty-three thousand, seven

29.  three hundred four million, eight hundred thousand, four hundred

30.  As of 2008, the population of the United States was about 304,967,000. Write the population in word form.

31.  Measurement  The land area of Florida is 100,000 + 30,000 + 9,000 + 800 + 50 + 2 square kilometers. Write the area in word form.

REAL-WORLD PROBLEM SOLVING

Planets  The Sun and Earth are shown.

32.  The distance from Earth to the Sun is 92,955,793 miles. Write this number in word form and expanded form.

33.  The amount of time that American astronauts have spent in space is about 13,507,804 minutes. Is this number read as thirteen million, fifty-seven thousand, eight hundred four? Explain.

H.O.T. Problems

34.  CHALLENGE  Write the number with the least value using the digits 1 through 9. Use each digit only once.

35.  WRITE MATH  Explain how you know what number is missing in 3,947 = 3,000 + ___ + 40 + 7.
Compare and Order Whole Numbers Through Millions

To compare numbers, you can use place value. The symbols below are used to show relationships of numbers.

- is greater than
- is less than
- is equal to

\[
\begin{align*}
300 &> 100 \\
200 &< 400 \\
500 &= 500
\end{align*}
\]

**REAL-WORLD EXAMPLE**

**DATA** The table shows the two largest oceans in the world. Which ocean has a greater area?

<table>
<thead>
<tr>
<th>Ocean</th>
<th>Approximate Area (Square miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlantic Ocean</td>
<td>33,420,160</td>
</tr>
<tr>
<td>Pacific Ocean</td>
<td>64,186,600</td>
</tr>
</tbody>
</table>

**Step 1** Line up the numbers so that the digits in the ones place align.

- 33,420,160
- 64,186,600

**Step 2** Begin at the greatest place. Compare the digits.

- \(33,420,160\)
- \(64,186,600\)
- \(6 > 3\)

So, the Pacific Ocean has a greater area.
**Real-World Example**

**Oil** The table shows the number of barrels of oil used each day in different countries. Use place value to order the data from greatest to least.

<table>
<thead>
<tr>
<th>Oil Usage</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
<td>Barrels per Day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>1,881,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>1,970,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1,827,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>20,730,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Step 1**
Line up the ones place. Compare the digits in the greatest place.

- 20,730,000 greatest
- 1,881,000
- 1,970,000
- 1,827,000

**Step 2**
Compare the digits in the next place.

- 20,730,000
- 1,881,000
- 1,970,000
- 1,827,000

**Step 3**
Compare the digits in the next place.

- 20,730,000 greatest
- 1,881,000
- 1,970,000
- 1,827,000

The numbers ordered from greatest to least are 20,730,000; 1,970,000; 1,881,000; and 1,827,000.

So, the order is the United States, France, Italy, and the United Kingdom.

---

**CHECK What You Know**

Replace each ___ with <, >, or = to make a true sentence. See Example 1

1. 655,543 ___ 556,543
2. 10,027,301 ___ 10,207,301
3. 352,033,629 ___ 352,033,629
4. 103,904,021 ___ 103,904,120

Order the numbers from greatest to least. See Example 2

5. 145,099; 154,032; 145,004; 159,023
6. 34,068,101; 34,608,010; 43,054,101; 34,608,101
7. **Measurement** Use the table to order the countries from greatest to least area.

<table>
<thead>
<tr>
<th>Country Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
</tr>
<tr>
<td>--------------</td>
</tr>
<tr>
<td>Argentina</td>
</tr>
<tr>
<td>Australia</td>
</tr>
<tr>
<td>India</td>
</tr>
<tr>
<td>Norway</td>
</tr>
</tbody>
</table>

8. **TALK MATH** When ordering whole numbers, explain what you do when the digits in the same place have the same value.
Replace each \( \_ \_ \) with <, >, or = to make a true sentence. See Example 1

9. 462,211 \( \_ \_ \) 426,222
10. 42,235,909 \( \_ \_ \) 42,324,909
11. 20,318,523 \( \_ \_ \) 21,318,724
12. 96,042,317 \( \_ \_ \) 96,042,317
13. 132,721,424 \( \_ \_ \) 132,721
14. 152,388,000 \( \_ \_ \) 152,388,010
15. 113,222,523 \( \_ \_ \) 113,333,523
16. 767,676,767 \( \_ \_ \) 676,767,676

Order the numbers from greatest to least. See Example 2

17. 138,023; 138,032; 139,006; 183,487
18. 3,452,034; 4,935,002; 34,035,952; 34,530,953
19. 731,364,898; 731,643,898; 73,264,898; 731,643,989
20. 395,024,814; 593,801,021; 395,021,814; 39,021,814

21. Rank the following states from least to greatest population.

<table>
<thead>
<tr>
<th>State</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>4,627,851</td>
</tr>
<tr>
<td>Colorado</td>
<td>4,861,515</td>
</tr>
<tr>
<td>Mississippi</td>
<td>2,918,785</td>
</tr>
<tr>
<td>Ohio</td>
<td>11,466,917</td>
</tr>
</tbody>
</table>

22. Order the cars from most expensive to least expensive.

<table>
<thead>
<tr>
<th>Most Expensive Cars</th>
<th>Price ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bugatti Veyron 16.4</td>
<td>1,192,057</td>
</tr>
<tr>
<td>Leblanc Mirabeau</td>
<td>645,084</td>
</tr>
<tr>
<td>Pagani Zonda Roadster</td>
<td>667,321</td>
</tr>
<tr>
<td>Saleen S7</td>
<td>555,000</td>
</tr>
</tbody>
</table>

23. **REASONING** List all of the possible digits that can replace the missing digit to make a true statement. 75,\( \_ \_ \)83,791 \( > \) 75,631,814

24. **OPEN ENDED** Write three numbers that are greater than 75,300,000 but less than 75,400,000.

25. **NUMBER SENSE** Use the digits 1, 2, 3, 4, 5, 6, and 9 to create four numbers. Order them from least to greatest.

26. **WRITE MATH** Write a real-world problem in which you would order three numbers from least to greatest.
Whole Numbers

PART A B C

Multi-Part Lesson

Problem-Solving Investigation

Main Idea I will use the four-step plan to solve a problem.

TERESA: The table shows the prices, including tax, of the toys sold at Toy Central.

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yo-Yo</td>
<td>$4</td>
</tr>
<tr>
<td>Jump rope</td>
<td>$6</td>
</tr>
<tr>
<td>Bubbles</td>
<td>$2</td>
</tr>
</tbody>
</table>

I can spend exactly $10 on toys. Which of the following combination of toys can I not buy?

- 2 yo-yos and 1 bubbles
- 3 bubbles and 1 yo-yo
- 1 jump rope and 3 bubbles

YOUR MISSION: Determine which combination of toys Teresa cannot buy.

Understand
You know she can spend $10 on toys and the prices of the toys. You need to determine which combination of toys she cannot buy.

Plan
You can solve the problem by finding the total cost of each combination of toys.

Solve
2 yo-yos and 1 bubbles: \( (2 \times $4) + (1 \times $2) \) or $10
3 bubbles and 1 yo-yo: \( (3 \times $2) + (1 \times $4) \) or $10
1 jump rope and 3 bubbles: \( (1 \times $6) + (3 \times $2) \) or $12
So, Teresa cannot buy 1 jump rope and 3 bubbles.

Check
Look back at the problem. The combination of 1 jump rope and 3 bubbles costs $12. Since $12 > $10, the answer makes sense.

GLE 0506.1.2 Apply and adapt a variety of appropriate strategies to problem solving, including estimation, and reasonableness of the solution. GLE 0506.2.1 Extend the understanding of place value through millions and millionths in various contexts and representations.
Use any strategy to solve each problem.

1. Latvia has 101 movie screens for every one million people. Sweden has 137 movie screens, and the United States has 105 movie screens for every one million people. Which country has the greatest number of movie screens for every one million people?

2. The table below shows the approximate distance each planet is from the Sun.

<table>
<thead>
<tr>
<th>Planet</th>
<th>Approximate Distance from Sun (mi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earth</td>
<td>93,000,000</td>
</tr>
<tr>
<td>Saturn</td>
<td>886,700,000</td>
</tr>
</tbody>
</table>

Which planet is closer to the Sun?

3. The cost of one jump rope is shown. If Ofelia has $15, does she have enough money to buy six jump ropes?

4. The United States produces about 251,000,000 tons of trash each year. About 82,000,000 tons are recycled each year. How many more tons of trash are produced than recycled each year?

5. Shane spent 20 minutes on reading homework. He spent half as many minutes completing his social studies homework. He spent 10 minutes longer on his math homework than his reading homework. How many minutes did he spend on homework?

6. **Measurement** Use the map below. Ty went from his house to school and then to Art’s house. Polly went from her house to school and then to Liana’s house. Who traveled farther?

7. Todd has $85 to spend on athletic shoes. The shoes cost $50. If he buys one pair, he gets a second pair for half price. How much money will he have left if he purchases two pairs of the shoes?

8. A relative gives you twice as many dollars as your age on each birthday. You are 11 years old. How much money have you been given over the years by this relative?

9. Twelve students are going on a field trip. Each student pays $6 for a ticket and $3 for lunch. Find the total cost for tickets and lunches.

10. **WRITE MATH** Write a problem that you can solve using the four-step plan.
Fractions and Decimals

Main Idea
I will use models to relate decimals to fractions.

Vocabulary
decimal
decimal point

Fractions and Decimals
Fractions and decimals are related. In a place-value chart, the place to the right of the ones place has a value of $\frac{1}{10}$ or one tenth. The next place value has a value of $\frac{1}{100}$ or one hundredth. Numbers that have digits in the tenths place, hundredths place, and beyond are called **decimals**. A **decimal point** is used to separate the ones place from the tenths place.

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Words</th>
<th>Decimal</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{1}{10}$</td>
<td>one tenth</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>decimal point</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>tenths place</td>
<td></td>
</tr>
</tbody>
</table>

Use a model to show $\frac{3}{10}$. Then write it in words and as a decimal.

**Step 1** Shade 3 rows in the grid.

**Step 2** The model shows three tenths or 0.3.

You can use a similar model for $\frac{1}{100}$.

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Words</th>
<th>Decimal</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{1}{100}$</td>
<td>one hundredth</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>decimal point</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>hundredths place</td>
<td></td>
</tr>
</tbody>
</table>
Lesson 2A Decimals

2 Use a model to show \(\frac{9}{100}\). Then write it in words and as a decimal.

**Step 1** Shade 9 of the 100 small squares.

**Step 2** The model shows nine hundredths or 0.09.

3 Use a model to show \(\frac{34}{100}\). Then write it in words and as a decimal.

**Step 1** Shade 34 of the 100 small squares.

**Step 2** The model shows thirty-four hundredths. Notice that there are 3 tenths and 4 hundredths shaded. As a decimal, this is written 0.34.

**Think About It**

1. The model at the right shows a thousandths cube. What fraction of the model is shaded? Then write as a decimal.

2. Model \(\frac{80}{100}\). Then name the fraction as a decimal in two different ways.

**Practice and Apply It**

Use a model to write each fraction in words and as a decimal.

3. \(\frac{7}{10}\)  
4. \(\frac{9}{10}\)  
5. \(\frac{5}{100}\)  
6. \(\frac{63}{100}\)

Write the decimal for each model. Write the related fraction.

7.  
8.  
9.  

10. **WRITE MATH** Explain why \(\frac{45}{100}\) is written as a decimal with a 4 in the tenths place and a 5 in the hundredths place.
Main Idea
I will represent fractions that name tenths, hundredths, and thousandths as decimals.

**Key Concept**
**Fractions to Decimals**

<table>
<thead>
<tr>
<th>Model</th>
<th>Fraction</th>
<th>Decimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nine tenths are shaded.</td>
<td>(\frac{9}{10})</td>
<td>0.9</td>
</tr>
<tr>
<td>Eighty-eight hundredths are shaded.</td>
<td>(\frac{88}{100})</td>
<td>0.88</td>
</tr>
<tr>
<td>Sixteen thousandths are shaded.</td>
<td>(\frac{16}{1,000})</td>
<td>0.016</td>
</tr>
</tbody>
</table>

Fractions that name tenths, hundredths, and thousandths have 1 digit, 2 digits, and 3 digits to the right of the decimal point when written in decimal form.
Lesson 2B  Decimals

Fractions as Decimals

1. **EXAMPLE**
   
   **Write** \(\frac{35}{100}\) **as a decimal.**
   
   \(\frac{35}{100}\) is 35 hundredths. Since the fraction names hundredths, there should be two digits to the right of the decimal point.
   
   So, \(\frac{35}{100} = 0.35\).

2. **REAL-WORLD EXAMPLE**
   
   **INSECTS** A bee hummingbird weighs only about \(\frac{56}{1,000}\) of an ounce. Represent this fraction as a decimal.
   
   The fraction names thousandths, so there should be 3 digits to the right of the decimal point.
   
   So, \(\frac{56}{1,000} = 0.056\).

**CHECK What You Know**

Use a model to write each fraction as a decimal. **See Examples 1, 2**

1. \(\frac{4}{10}\)
2. \(\frac{2}{10}\)
3. \(\frac{58}{100}\)
4. \(\frac{74}{100}\)
5. \(\frac{6}{100}\)
6. \(\frac{5}{100}\)
7. \(\frac{795}{1,000}\)
8. \(\frac{9}{1,000}\)
9. In a class survey, \(\frac{60}{100}\) students said that they have a pet. Write this result as a decimal.
10. **TALK MATH** Describe a rule for writing fractions like \(\frac{8}{100}\) and \(\frac{32}{1,000}\) as decimals.
Use a model to write each fraction as a decimal. See Examples 1, 2

11. \( \frac{3}{10} \)  
12. \( \frac{9}{10} \)  
13. \( \frac{86}{100} \)  
14. \( \frac{99}{100} \)  
15. \( \frac{107}{1,000} \)  
16. \( \frac{387}{1,000} \)  
17. \( \frac{51}{1,000} \)  
18. \( \frac{80}{1,000} \)  
19. \( \frac{60}{100} \)  
20. \( \frac{22}{1,000} \)  
21. \( \frac{4}{100} \)  
22. \( \frac{1}{1,000} \)  

23. Mrs. Carroll bought \( \frac{8}{10} \) pound of turkey. Write this fraction as a decimal.

24. A runner decreased his time by \( \frac{5}{100} \) of a second. Express this decrease as a decimal.

25. About \( \frac{7}{10} \) of a person’s body weight is water. Write this fraction as a decimal.

26. It rains only 9 hundredths of an inch each year in Ica, Peru. Write this number as a decimal.

**Measurement** Write the customary measure for each metric measure as a decimal.

27. 1 kilometer
28. 1 millimeter
29. 1 gram
30. 1 liter

<table>
<thead>
<tr>
<th>Metric Measure</th>
<th>Customary Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 kilometer</td>
<td>( \frac{62}{100} ) mile</td>
</tr>
<tr>
<td>1 millimeter</td>
<td>( \frac{4}{100} ) inch</td>
</tr>
<tr>
<td>1 gram</td>
<td>( \frac{35}{1,000} ) ounce</td>
</tr>
<tr>
<td>1 liter</td>
<td>( \frac{908}{1,000} ) quart</td>
</tr>
</tbody>
</table>

**H.O.T. Problems**

31. **OPEN ENDED** Write a fraction that has a denominator of 100. Then write the fraction as a decimal and draw a model to represent the decimal.

32. **FIND THE ERROR** Dylan is writing \( \frac{95}{1,000} \) as a decimal. Find his mistake and correct it.

\[
\frac{95}{1,000} = 0.950
\]

33. **WRITE MATH** Explain how the word form of a fraction can help you write the fraction as a decimal.
In 2008, Britta Steffen of the United States set an Olympic record. She swam the 100-meter freestyle in 53.12 seconds.

You can read the time as:
• fifty-three and twelve hundredths seconds

You can write the time as:
• 53 and 12 hundredths seconds

You have seen that the place-value chart used for whole numbers can be extended to include decimals like 53.12. The decimal point separates the ones place and the tenths place.

### Place-Value Chart

<table>
<thead>
<tr>
<th>tens</th>
<th>ones</th>
<th>tenths</th>
<th>hundredths</th>
<th>thousandths</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

The digit 1 is in the tenths place. Its value is 0.1.
The digit 2 is in the hundredths place. Its value is 0.02.

### EXAMPLE

**Place of Digits in Decimals**

Name the place of the underlined digit in 0.247. Then write the value of the digit.

The digit 7 is in the thousandths place. The digit represents 0.007.

Just as with whole numbers, you can also write decimals in standard form and expanded form.
Example: Standard and Expanded Form

2 Write five and six hundred fourteen thousandths in standard form and in expanded form.

Standard form: 5.614

Expanded form:
- value of 5 → 5 is in the ones place.
- value of 6 → 0.6 is in the tenths place.
- value of 1 → 0.01 is in the hundredths place.
- value of 4 → 0.004 is in the thousandths place.

So, in expanded form 5.614 = 5 + 0.6 + 0.01 + 0.004.

Remember
Use the word and for the decimal point.

REAL-WORLD EXAMPLE

Decimals in Word Form

3 Measurement Five tree taps produce enough maple sap to make 1 gallon, or about 3.79 liters, of syrup. Read and write the number of liters in word form.

<table>
<thead>
<tr>
<th>tens</th>
<th>ones</th>
<th>tenths</th>
<th>hundredths</th>
<th>thousandths</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>7</td>
<td>9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The place value of the last digit, 9, is hundredths.

Word form: three and seventy-nine hundredths

The place-value chart for decimals can be extended to millionths.

REAL-WORLD EXAMPLE

4 Measurement The thickness of a piece of hair is about 0.000017 of a meter. Read and write the number of meters in word form.

<table>
<thead>
<tr>
<th>ones</th>
<th>tenths</th>
<th>hundredths</th>
<th>thousandths</th>
<th>ten-thousandths</th>
<th>hundred-thousandths</th>
<th>millionths</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>7</td>
</tr>
</tbody>
</table>

The place value of the last digit, 7, is millionths.

Word form: seventeen millionths
Check What You Know

Name the place of the underlined digit. Then write the value of the digit. See Example 1

1. 6.14
2. 4.036219

Write each number in standard form. See Example 2

3. 5 and 87 hundredths
4. 20 + 6 + 0.9 + 0.01 + 0.004

Write each number in expanded form. Then read and write in word form. See Examples 2–4

5. 19.4
6. 35.19
7. 1.608
8. 7.000485
9. A spider can travel one and two tenths miles per hour. Write this as a decimal.

Practice and Problem Solving

Name the place of the underlined digit. Then write the value of the digit. See Example 1

11. 63.47
12. 9.56
13. 4.072738
14. 81.453062

Write each number in standard form. See Example 2

15. 13 and 9 tenths
16. fifty and six hundredths
17. 10 + 1 + 0.9 + 0.02 + 0.003
18. 7 + 0.1 + 0.005

Write each number in expanded form. Then read and write in word form. See Examples 2–4

19. 4.28
20. 0.917
21. 69.409
22. 20.05
23. 13.09
24. 0.25
25. 92.301997
26. 2.047631

27. An athlete completes a race in 57.505 seconds. Name all the places the digit 5 appears in the number.

28. There were three and five hundredths inches of rain yesterday. Write this number in standard form.

29. A baseball player had a batting average of 0.334 for the season. Write this number in expanded form.

30. The table shows the amount of salt that remains when a cubic foot of water evaporates. Read each number that describes the amount of salt. Then write each number in words.

<table>
<thead>
<tr>
<th>Source of Water</th>
<th>Amount of Salt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlantic Ocean</td>
<td>2.2 pounds</td>
</tr>
<tr>
<td>Lake Michigan</td>
<td>0.01 pound</td>
</tr>
</tbody>
</table>
31. **OPEN ENDED** Write a number that has 6 in the thousandths place.
   Then write the number in expanded form and word form.

32. **WHICH ONE DOESN'T BELONG?** Identify the decimal that does not belong with the other three. Explain your reasoning.

![Model with shaded parts representing decimals]

- **A.** 45
- **B.** 4.5
- **C.** 0.45
- **D.** 0.045

5, 3, 9
5 + 0.3 + 0.09
5 and 39 tenths

33. **WRITE MATH** Name an advantage of using 0.8 instead of \( \frac{8}{10} \).

34. Which decimal is represented in the model below?

   - **A.** 45
   - **B.** 4.5
   - **C.** 0.45
   - **D.** 0.045

35. Which decimal represents the total value of 5 nickels, 1 quarter, and 3 dimes when compared to 1 dollar?

   - **F.** 0.08
   - **G.** 8.0
   - **H.** 0.80
   - **I.** 0.008

36. Write each decimal as a fraction in simplest form.

   - **0.08**
   - **0.24**
   - **0.005**

More About **Write Decimals as Fractions**

To write a decimal as a fraction, use place value.

**EXAMPLES**

Write each decimal as a fraction in simplest form.

1. **0.7**

   \[ 0.7 = \frac{7}{10} \]  
   Say seven tenths.

2. **0.014**

   \[ 0.014 = \frac{14}{1,000} = \frac{7}{500} \]  
   Say fourteen thousandths.
   Simplify.

**Test Practice**

To assess mastery of SPI 0506.2.1, see your Tennessee Assessment Book.
**Compare Decimals**

Comparing decimals is similar to comparing whole numbers.

**Main Idea**

I will compare decimals.

**Vocabulary**

*equivalent decimals*

---

**REAL-WORLD EXAMPLE**

**MUSIC** Luis downloaded two songs onto his MP3 player. Which song is longer?

<table>
<thead>
<tr>
<th>Song</th>
<th>Length (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.6</td>
</tr>
<tr>
<td>2</td>
<td>3.8</td>
</tr>
</tbody>
</table>

**One Way:** Use a number line.

Numbers to the right are greater than numbers to the left. Since 3.8 is to the right of 3.6, 3.8 > 3.6.

**Another Way:** Use place value.

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line up the decimal points.</td>
<td>Compare the digits in the greatest place.</td>
<td>Continue comparing until the digits are different.</td>
</tr>
<tr>
<td>3.6</td>
<td>3.6</td>
<td>3.6</td>
</tr>
<tr>
<td>3.8</td>
<td>3.8</td>
<td>3.8</td>
</tr>
</tbody>
</table>

The ones digits are the same.

In the tenths place, 6 < 8. So, 3.6 < 3.8.

So, Song 2 is longer.
Decimals that have the same value are **equivalent decimals**.

The shaded part of each model is the same. So, \(0.8 = 0.80\).

The model shows you can **annex**, or place zeros, to the right of a decimal without changing its value.

**Compare Decimals**

2. Replace \(\_\) with <, >, or = to make \(0.450 \_ 0.45\) a true sentence.
   
   \[0.450 = 0.450\]
   
   Annex a zero. The value does not change.
   
   So, \(0.450 = 0.45\).

3. Replace \(\_\) with <, >, or = to make \(8.69 \_ 8.6\) a true sentence.
   
   \[8.69 \rightarrow 8.69\]
   
   \[8.6 \rightarrow 8.60\]
   
   Annex a zero to the right of 8.6 so that it has the same number of decimal places as 8.69.

   Since 9 > 0 in the hundredths place, \(8.69 > 8.6\).

**Check What You Know**

Replace each \(\_\) with <, >, or = to make a true sentence. See Examples 1–3

1. 0.5 \(\_\) 0.7
2. 0.62 \(\_\) 0.26
3. 3.7 \(\_\) 3.70
4. 4.40 \(\_\) 4.44
5. 0.003 \(\_\) 0.102
6. 9.624 \(\_\) 9.618
7. 0.03462 \(\_\) 0.034620
8. 9.712361 \(\_\) 9.712631
9. 6.500 \(\_\) 6.5

10. Each year, Wadis Halfa, Sudan, gets about 2.5 millimeters of rain, and Luxar, Egypt, gets about 0.76 millimeter of rain. Which place gets more rain each year?

11. **Talk Math** Describe how you know if two decimals are equivalent.
Replace each \(\_\) with \(<\), \(>\), or \(=\) to make a true sentence. See Examples 1–3

12. \(4.4 \_ 4.1\)  
13. \(0.39 \_ 0.37\)  
14. \(0.57 \_ 0.65\)

15. \(2.15 \_ 2.150\)  
16. \(0.1 \_ 0.006\)  
17. \(0.652 \_ 0.647\)

18. \(0.09 \_ 0.001\)  
19. \(7.304 \_ 7.30\)  
20. \(2.800 \_ 2.8\)

21. \(0.000657 \_ 0.000066\)  
22. \(0.09109 \_ 0.00919\)  
23. \(5.005 \_ 5.0005\)

24. A cat’s normal body temperature is 101.5 degrees Fahrenheit. A rabbit’s normal body temperature is 103.1 degrees Fahrenheit. Which animal has a lower normal body temperature?

25. Measurement Gold leaf is used in decorating metals, woodwork, and even certain foods. One sheet of gold leaf is about 0.000004 inch thick. Is this greater than or less than the thickness of silver leaf, which is 0.000005 inch thick?

For Exercises 26–28, use the table at the right that shows the cost of posters of famous works of art.

26. Does the poster *Relativity* or the poster *Women and Bird in the Night* cost more?

27. Which poster costs less: *From the Lake, No. 1* or *Waterlillies*?

28. Which poster costs less than *Waterlillies*?

Use the information to solve the problem.

**Greenhouse Shopping Spree!**

Remember to compare by place value!

29. How does the price for FasGro soil compare to the price of Summer Green soil?
30. **OPEN ENDED** Write two decimals that are equivalent to 18.7. Tell why they are equivalent.

31. **CHALLENGE** How many times greater is 46 than 0.46? Explain.

32. **WRITE MATH** Discuss the similarities and differences between comparing whole numbers and comparing decimals.

### Test Practice

#### 33. Which of the following numbers is greater than 7.02?
- **A.** 7.021
- **B.** 7.020
- **C.** 7.002
- **D.** 7.0

#### 35. Which of the following lists three decimals between 8.6 and 9.2?
- **F.** eight and seven tenths, 8.61, 8.5
- **G.** eight and seven hundredths, 9.1, 9.0
- **H.** eight and eight tenths, 9.21, 9.01
- **I.** eight and seventy-five hundredths, 8.80, 9.19

#### 34. **GRIDDED RESPONSE** What is the standard form for the following?

3 + 0.007 + 0.0002

#### 36. Which of the following shows the correct order from least to greatest?
- **A.** 0.225, 0.0225, 2.25
- **B.** 0.225, 2.0225, 2.225
- **C.** 2.225, 0.0225, 2.025
- **D.** 2.25, 2.0225, 2.025

### Spiral Review

Use place value to write each number in expanded form. (Lesson 2C)

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>37. 0.85</td>
<td>38. 2.09</td>
<td>39. 5.074</td>
<td>40. 16.731</td>
</tr>
</tbody>
</table>

41. The model at the right has \(\frac{6}{10}\) of its squares shaded. Write the decimal that is represented by the shaded portion. (Lesson 2B)

42. Della wants to score 32 goals this soccer season. So far, she has scored 26 goals and there are 3 games left this season. If she scores the same number of goals in each of the remaining games, how many goals must she score per game to score 32 goals? (Lesson 1C)
Name the place of the underlined digit. Then write the value of the digit. (Lesson 1A)

1. 42,924,603  
2. 953,187

3. MULTIPLE CHOICE  In which number does 6 have a value of 60,000,000? (Lesson 1A)
   A. 1,862,940  
   B. 16,743,295  
   C. 564,103,278  
   D. 693,751,842

The graph shows the size of three Alaskan parks. (Lesson 1A)

4. Write the number of acres of Wrangell–St. Elias in expanded and word form.

5. Write in words how you would read the number of acres in Denali park.

Replace each \( \_ \) with \(<\), \(>\), or \(=\) to make a true sentence. (Lesson 1B)

6. 84 \(<\) 90  
7. 542 \(<\) 524  
8. 925 \(<\) 1,024  
9. 6,132 \(\geq\) 6,231

10. The attendance at Friday’s baseball game was 45,673. Sunday’s game attendance was 45,761. Which game had a greater attendance? (Lesson 1B)

11. A fifth-grade teacher has 24 students in class. She wants to give each student 3 pencils. If she has 56 pencils, how many more pencils does she need? (Lesson 1C)

Use a model to write each fraction as a decimal. (Lesson 2B)

12. \( \frac{1}{10} \)  
13. \( \frac{85}{100} \)  
14. \( \frac{492}{1,000} \)  
15. \( \frac{39}{1,000} \)

16. MULTIPLE CHOICE  Which decimal represents the shaded part of the figure? (Lesson 2B)
   F. 0.0052  
   H. 0.52  
   G. 0.052  
   I. 5.2

17. Write four millionths as a decimal. (Lesson 2C)

18. WRITE MATH Explain how to compare the decimals 6.008 and 6.041. (Lesson 2D)
Main Idea
I will order whole numbers and decimals.

Order Whole Numbers and Decimals

You can use place value to order numbers from greatest to least.

REAL-WORLD EXAMPLE

STADIUMS The table shows the cost to build three National League Football stadiums. Order the costs of the stadiums from greatest to least.

<table>
<thead>
<tr>
<th>Cost to Build (millions $)</th>
<th>364.2</th>
<th>430.0</th>
<th>350.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>INVESCO Field</td>
<td>Englewood, CO</td>
<td>Ford Field</td>
<td>Detroit, MI</td>
</tr>
<tr>
<td>Quest Field</td>
<td>Seattle, WA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

One Way: Use place value.

Step 1 Line up the decimal points.
364.2
430.0
350.0

Step 2 Compare the digits in the greatest place.
364.2
430.0 ← greatest
350.0

Step 3 Compare the digits in the next place.
364.2
430.0
350.0 ← least

Another Way: Use a number line.

So, the costs, in millions of dollars, from greatest to least are 430.0, 364.2, and 350.0.
**Order Decimals**

**SPORTS** Ava’s scores for three gymnastics events are shown in the table. Order her scores from least to greatest.

<table>
<thead>
<tr>
<th>Event</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beam</td>
<td>9.375</td>
</tr>
<tr>
<td>Bars</td>
<td>8.950</td>
</tr>
<tr>
<td>Floor</td>
<td>9.275</td>
</tr>
</tbody>
</table>

**Step 1** Line up the decimal points.

- 9.275
- 8.950
- 9.375

**Step 2** Compare the digits in the greatest place.

- 9.275
- 8.950 ← least
- 9.375 ← greatest

The scores from least to greatest are 8.950, 9.275, and 9.375.

**MAIL** Four packages weighing 22.7, 23.84, 22, and 23.9 pounds were mailed. Order the weights from greatest to least.

**Step 1** Line up the decimal points.

- 22.7
- 23.84
- 22
- 23.9

**Step 2** Annex zeros so all numbers have the same final place value.

- 22.70
- 23.84
- 22.00
- 23.90

**Step 3** Compare and order using place value.

- 23.90
- 23.84
- 22.70
- 22.00

The weights from greatest to least are 23.9, 23.84, 22.7, and 22.

**CHECK What You Know**

Order each set of numbers from least to greatest. See Examples 1–3

1. weight in kilograms of a dog: 56.7, 64.3, 59.0, 64.5
2. rainfall in inches: 0.76, 0.09, 0.63, 0.24
3. height of flowers in inches: 8.9, 8.59, 8.705, 8.05
4. length of cells in millimeters: 0.000026, 0.0000033, 0.000006
5. The length of insects in centimeters are: 1.35, 0.9, 1.48, and 1.8. Order the sizes of the insects from greatest to least.

6. **TALK MATH** Discuss different steps that make ordering numbers easier.
Order each set of numbers from least to greatest.  See Examples 1–3

7. cost of cellphones: $98.75, $114.99, $105.99

8. temperatures in °F: 106.3, 99.8, 101.1, 110.5

9. distance in light years: 4.2, 6.0, 4.3, 7.7

10. heights of buildings in meters: 419.7, 346.5, 178.3, 527.3

11. kilometers ran: 4.9, 3.7, 3.4, 4.2

12. costs of snacks: $2.43, $2.34, $2.05, $2.18, $1.99

13. masses of bottles in grams: 9.14, 7.99, 9.02, 8.95, 8.91

14. race times in seconds: 43.789, 67.543, 86.347, 78.432, 34.678

15. heights of trees in meters: 9.8, 10, 10.2, 9.6, 11

16. weights of dogs in pounds: 25.4, 26.2, 26, 25.8, 27

17. The table shows the diameters of several types of viruses. Which virus has the greatest diameter? Which virus has the least diameter?

<table>
<thead>
<tr>
<th>Virus</th>
<th>Diameter (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ebolavirus</td>
<td>0.00008</td>
</tr>
<tr>
<td>Influenza (Flu)</td>
<td>0.00009</td>
</tr>
<tr>
<td>Varicella Zoster (Chicken Pox)</td>
<td>0.00015</td>
</tr>
</tbody>
</table>

Use the information to solve the problem.

Greenhouse Shopping Spree!

I wonder which brand is cheaper?

18. Order the prices of brands of seeds from least to greatest.
19. The following measures are the long jump distances of the top six finishers in the 2008 Summer Olympics. Which distance was greater than 8.22 meters, but less than 8.29 meters?
8.07 m, 8.16 m, 8.24 m, 8.34 m, 8.19 m, 8.20 m

20. The table shows the heights of the tallest indoor waterfalls. Order the heights from greatest to least.

<table>
<thead>
<tr>
<th>Location</th>
<th>Height (meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel Windsor, Michigan</td>
<td>18.3</td>
</tr>
<tr>
<td>International Center, Michigan</td>
<td>34.7</td>
</tr>
<tr>
<td>Mohegan Sun, Connecticut</td>
<td>26.1</td>
</tr>
<tr>
<td>Orchid Hotel, India</td>
<td>21.3</td>
</tr>
<tr>
<td>Trump Tower, New York</td>
<td>27.4</td>
</tr>
</tbody>
</table>

Data File

The table shows facts about snakes common to the United States.

<table>
<thead>
<tr>
<th>Snake</th>
<th>Average Adult Body Length (cm)</th>
<th>Average Baby Body Length (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copperhead</td>
<td>63.5</td>
<td>27.9</td>
</tr>
<tr>
<td>Western Cottonmouth</td>
<td>91.25</td>
<td>21.5</td>
</tr>
<tr>
<td>Timber Rattlesnake</td>
<td>121.6</td>
<td>29.5</td>
</tr>
<tr>
<td>Queen Snake</td>
<td>61</td>
<td>15.2</td>
</tr>
</tbody>
</table>

21. List the average baby body lengths from least to greatest.

22. Write the names of the snakes in order from greatest to least average adult body length.

23. The average length of an adult Eastern Coachwhip snake is 152.4 centimeters. Write a sentence comparing its length to the length of the other snakes listed in the table.

H.O.T. Problems

24. **OPEN ENDED** Write an ordered list of five numbers whose values are between 50.98 and 51.6. Tell whether your list is from least to greatest or greatest to least.

25. **WRITE MATH** Write a real-world problem that can be solved by finding the least number from: 12.33, 12.2, 11.79, 11.9, and 12.05.
26. Matt completed his first race in 15.163 seconds. The time of his second race was 15.24 seconds. Which of the following choices correctly shows the relationship between 15.163 and 15.24?

A. 15.163 < 15.24
B. 15.163 > 15.24
C. 15.24 < 15.163
D. 15.24 = 15.163

27. The table shows the seating capacity of the three largest stadiums in the world. Which is a true statement?

<table>
<thead>
<tr>
<th>Stadium</th>
<th>Maximum Seating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maracaña Municipa (Brazil)</td>
<td>205,000</td>
</tr>
<tr>
<td>Rungrado (North Korea)</td>
<td>150,000</td>
</tr>
<tr>
<td>Strahov (Czech Republic)</td>
<td>240,000</td>
</tr>
</tbody>
</table>

F. The Maracaña Municipa is larger than the Rungrado.
G. The Strahov is smaller than the Maracaña Municipa.
H. The Maracaña Municipa is the largest stadium.
I. The Strahov is the smallest stadium.

28. Replace each \( _25CEh \) with <, >, or = to make a true sentence. (Lesson 2D)

29. 46.49 \( _25CEh \) 46.5
30. 2.79 \( _25CEh \) 2.37
31. 10.56 \( _25CEh \) 10.65

31. 7.3
32. 0.81
33. 2.99
34. 5.00046

35. Describe the size of the Tennessee Aquarium in expanded form.

36. How many square feet is The Freshwater Center? Write in expanded form.

37. Describe the size of the Great Lakes Aquarium in word form.
Get Ready!
Players: 2 players

Get Set!
★ Each player creates ten game sheets like the one shown at the right, one for each of ten rounds.
★ Make a spinner as shown.

Go!
★ One player spins the spinner.
★ Each player writes the number in one of the blanks on his or her game sheet.
★ The other player spins the spinner, and each player writes the number in a blank.
★ Play continues until all blanks are filled.
★ The person with the greater decimal scores 1 point. If players have the same decimal, each player scores 1 point.

Repeat for ten rounds.
★ The person with the greater number of points after ten rounds is the winner.
**Problem-Solving Strategy:** Work Backward

**Main Idea** I will solve problems by using the *work backward* strategy.

**P.S.I. TEAM +**

**VICTOR:** I spent $61 on some sandpaper for my model cars. I bought 2 packages of the smallest-grain sandpaper and spent the rest on the largest-grain sandpaper. How many packages of the largest-grain sandpaper did I buy?

**YOUR MISSION:** Find the number of packages of the largest-grain sandpaper.

<table>
<thead>
<tr>
<th>Sandpaper</th>
<th>Size of Grain (cm)</th>
<th>Cost per Package ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra Fine</td>
<td>0.0036</td>
<td>13</td>
</tr>
<tr>
<td>Fine</td>
<td>0.0115</td>
<td>7</td>
</tr>
<tr>
<td>Ultra Fine</td>
<td>0.00103</td>
<td>20</td>
</tr>
</tbody>
</table>

**Understand**

You know that a total of $61 was spent. You know that 2 packages of the smallest-grain sandpaper were purchased. The rest was spent on the largest-grain sandpaper.

**Plan**

To solve this problem, you can work backward.

**Solve**

Order the sizes from least to greatest: 0.00103, 0.0036, 0.0115.

The smallest size is 0.00103, or ultra fine sandpaper. Victor spent $20 or $40 for ultra fine sandpaper. Subtract to find the remaining amount spent: $61 − $40 = $21.

The largest size is 0.0115, or fine sandpaper. Each package costs $7. Divide to find the number of packages bought: $21 ÷ $7 = 3.

So, Victor bought 3 packages of the largest-grain sandpaper.

**Check**

$(2 \times $20) + (3 \times $7) = $61 \checkmark$

**GLE 0506.1.2** Apply and adapt a variety of appropriate strategies to problem solving, including estimation, and reasonableness of the solution.
Refer to the problem on the previous page.

1. Explain how the work backward strategy helped Victor find how many packages of the largest grain of sandpaper he bought.

2. Suppose Victor bought 3 packages of very fine sandpaper at $10 each and some packages of fine sandpaper. If he spent $44, how many packages of fine sandpaper did he buy?

3. Explain how you can check the solution to Exercise 2.

4. Explain when you would use the work backward strategy to solve a problem.

Solve. Use the work backward strategy.

5. Luisa bought a roll of ribbon. She used 34 inches on each of two gifts. Then she used 13 inches on a scrapbook page. There are 39 inches left. How many inches did she start with?

6. The table below shows the number of ounces of butter Marti used in different recipes. She has 6 ounces of butter left. How many ounces of butter did she have at the beginning?

<table>
<thead>
<tr>
<th>Recipe</th>
<th>Butter (oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pie</td>
<td>4</td>
</tr>
<tr>
<td>Cookie</td>
<td>8</td>
</tr>
<tr>
<td>Pasta</td>
<td>6</td>
</tr>
</tbody>
</table>

8. You divide a number by 3, add 6, then subtract 7. The result is 4. What is the number?

9. Mr. Toshio lent out 11 rulers at the beginning of class, collected 4 rulers in the middle of class, and gave out 7 at the end of class. He had 18 at the end of the day. How many rulers did he start with?

10. The Math Club is selling gift wrap for a fundraiser. They sold all 45 rolls of solid wrapping paper at $4 each and rolls of patterned wrapping paper at $5 each. If they made $265, how many rolls of patterned wrapping paper did they sell?

7. At the end of their 3-day vacation, the Palmers traveled a total of 530 miles. On the third day, they drove 75 miles. On the second day, they drove 320 miles. How many miles did they drive the first day?
How big is the United States? In total land area, the United States is about 9,162,000 square kilometers. This number can be written as a decimal, 9.162 million square kilometers. Like whole numbers, decimals can be used to compare the land area of the world’s largest countries. Compare the land area of Canada and the United States.

9.094 million < 9.162 million

Therefore, the land area of Canada is less than the land area of the United States.
Use the information on the previous page to solve each problem.

1. Write an inequality comparing the land area of Russia with the land area of Australia.

2. Write an inequality comparing the land area of the United States with the land area of Australia.

3. The land area of Canada is about 3 times as great as which country’s land area?

4. The land area of Brazil is about 8.457 million square kilometers, and the total area of Brazil is about 8.512 million square kilometers. Write an inequality comparing Brazil’s land area to its total area.

5. Order the land area of Canada, China, and the United States from least to greatest.
Vocabulary

decimal
equivalent decimals
expanded form
place value
standard form

Vocabulary Check
State whether each sentence is true or false. If false, replace the underlined word or number to make a true sentence.

1. The symbol $>$ means greater than.
2. The number 50.02 written in standard form is $50 + 0.02$.
3. The number 7,105 is equal to 7,501.
4. The digit 4 in 245,100,000 is in the millions place.
5. A decimal is a number that has at least one digit to the right of the decimal point.
6. Eight and two hundredths written as a decimal is 0.802.
Multi-Part Lesson Review

Lesson 1

Whole Numbers

Place Value Through Millions (Lesson 1A)

Name the place value of the underlined digit. Then write the number it represents.

7. 195,489
8. 6,720,341

Use place value to write each number in standard form.

9. 94 billion, 237 million, 108
10. 8,000,000 + 50,000 + 2,000 + 600

Write each number in expanded form. Then read and write in word form.

11. 4,302
12. 1,279,018
13. Measurement Montana has an area of 147,165 square miles. Write this number in word form.

Compare and Order Whole Numbers (Lesson 1B)

Replace each \( \_ \) with <, >, or = to make a true sentence.

14. 98 \( \_ \) 70
15. 234 \( \_ \) 1,510
16. 8,960 \( \_ \) 8,960
17. 814,789,002 \( \_ \) 814,789,020
18. Is the population of Jacksonville or San Francisco greater?

<table>
<thead>
<tr>
<th>City</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jacksonville, Florida</td>
<td>777,704</td>
</tr>
<tr>
<td>San Francisco, California</td>
<td>744,230</td>
</tr>
</tbody>
</table>

EXAMPLE 1

Name the place of the underlined digit in 24,900. Then write the value of the digit.

place: ten thousands
value: 20,000

EXAMPLE 2

Use place value to write the following number in standard form and expanded form.

ten million, twenty thousand, four hundred sixteen

Standard: 10,020,416
Expanded: 10,000,000 + 20,000 + 400 + 10 + 6

EXAMPLE 3

Replace \( \_ \) with <, >, or = to make 4,249,800 \( \_ \) 4,210,756 a true sentence.

Step 1 Line up the digits.

4,249,800
4,210,756

Step 2 Compare each place value, starting at the left.

Since 4 > 1 in the ten thousands place, 4,249,800 > 4,210,756.
Problem-Solving Investigation: The Four-Step Plan *(Lesson 1C)*

Solve. Use the four-step plan.

19. **Measurement** There are three long tunnels that go under Boston Harbor. The Summer Tunnel is 5,653 feet long. The Callahan Tunnel is 5,070 feet long. The Ted Williams Tunnel is 8,448 feet long. Order the lengths of the tunnels from least to greatest. Which tunnels are shorter than 5,670 feet in length?

20. How much more money is spent on strawberry and grape jelly than the other types of jelly each year?

<table>
<thead>
<tr>
<th>Yearly Jelly Sales (thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strawberry and grape</td>
</tr>
<tr>
<td>All others</td>
</tr>
</tbody>
</table>

21. \( \frac{19}{100} \)

22. \( \frac{8}{10} \)

23. \( \frac{644}{1,000} \)

24. \( \frac{2}{100} \)

25. four tenths

26. thirteen thousandths

27. Pedro made six tenths of the free throws he attempted this season. Write the fraction of free throws that he made as a decimal.

**EXAMPLE 4**

On Sunday, Li ate 2,072 Calories. On the same day, her brother ate 2,141 Calories. Who ate more Calories on Sunday?

**Understand** Li ate 2,072 Calories. Her brother ate 2,141 Calories. Find who ate more.

**Plan** Use place value to determine who ate more Calories on Sunday.

**Solve** Line up the digits. Compare place value starting at the left. Li’s brother ate more Calories.

**Check** 2,072 < 2,141

**EXAMPLE 5**

Use a model to write \( \frac{41}{1,000} \) as a decimal.

The fraction names thousandths, so there should be 3 digits to the right of the decimal point. \( \frac{41}{1,000} = 0.041 \)
Place Value Through Millionths (Lesson 2C)

Use place value to write each number in standard form.

28. five and nine tenths
29. 0.7 + 0.01 + 0.002

Write each number in expanded form. Then read and write in word form.

30. 0.53 31. 0.068
32. 1.22 33. 0.009745

34. Measurement The winner of an inline skating race finished in 40.375 minutes. Write this time in word form.

Compare Decimals (Lesson 2D)

Replace each \( \leq \) with \(<\), \(>\), or \(=\) to make a true sentence.

35. 0.1 \( \leq \) 0.11 36. 0.49 \( \leq \) 0.71
37. 3.6 \( \leq \) 3.16 38. 9.02 \( \leq \) 9.020
39. 0.843 \( \leq \) 0.846 40. 4.25 \( \leq \) 4.025

41. Measurement The table shows the speeds of two fish.

<table>
<thead>
<tr>
<th>Fish</th>
<th>Speed (mi per h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bluefin tuna</td>
<td>43.4</td>
</tr>
<tr>
<td>Wahoo</td>
<td>48.5</td>
</tr>
</tbody>
</table>

Is the bluefin tuna or the wahoo faster? Tell why.
Lesson 3

Order Whole Numbers and Decimals

Order each set of numbers from least to greatest.

42. 13.84, 13.097, 13, 12.655, 13.6

43. 0.63001, 0.00631, 0.06031

44. Refer to the table. List these countries from the greatest to least number of bikes per person.

<table>
<thead>
<tr>
<th>Country</th>
<th>Bikes per Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>0.37</td>
</tr>
<tr>
<td>Germany</td>
<td>0.88</td>
</tr>
<tr>
<td>Japan</td>
<td>0.63</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1.10</td>
</tr>
<tr>
<td>United States</td>
<td>0.49</td>
</tr>
</tbody>
</table>

Order 60.11, 60, and 61.038 from least to greatest.

Step 1 60.11  Line up the decimal points.

60
61.038

Step 2 60.110 Annex zeros so all numbers have the same final place value.

60.000
61.038

Step 3 60.000 Compare and order using place value.

60.110
61.038

The numbers in order from least to greatest are 60, 60.11, and 61.038.

Problem-Solving Strategy: Work Backward

45. Megan has 104 books on four bookshelves. On the first bookshelf, she has 21 books. On the second bookshelf, she has 39 books. She has the same number of books on the third and fourth bookshelves. How many books are on the third bookshelf?

46. After fundraising, a soccer team had a balance of $585. They spent $127 on posters for the fundraiser and $29 on an ad in the newspaper. If they made $563 during fundraising, how much money did they have before fundraising?

EXAMPLE 9

Jacy spent $153 at the grocery store. He spent $45 on frozen foods, $91 on packaged foods, and the rest on fresh fruits and vegetables. How much did he spend on fruits and vegetables?

Subtract to undo the cost of the frozen foods.

$153 − $45 = $108

Subtract to undo the cost of the packaged foods.

$108 − $91 = $17

So, Jacy spent $17 on fresh fruits and vegetables.
Name the place value of the underlined digit. Then write the number it represents.

1. 237,961  2. 804,510,327
3. 6.457  4. 0.892

5. **MULTIPLE CHOICE** Write 4 million, 76 thousand, 850 in standard form.
   
   A. 4,076,085  C. 4,760,850
   B. 4,076,850  D. 4,076,850,000

6. Jacob gave 13 stickers to Catie and 17 to Ruby. Then he traded 8 of his stickers for 6 of Owen’s stickers. Jacob now has 35 stickers. How many stickers did he start with?

Write each number in word form.

7. 18,709  8. 3,524,064
9. 5.921  10. 0.00015

11. **MULTIPLE CHOICE** What part of the model is shaded?

   F. 0.006  H. 0.6
   G. 0.06  I. 6.0

Write each fraction as a decimal.

12. \(\frac{31}{100}\)  13. \(\frac{4}{10}\)
14. \(\frac{985}{1,000}\)  15. \(\frac{16}{1,000}\)

The table shows the lengths of several types of whales.

<table>
<thead>
<tr>
<th>Type of Whale</th>
<th>Length (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fin whale</td>
<td>90</td>
</tr>
<tr>
<td>Sei whale</td>
<td>72</td>
</tr>
<tr>
<td>Right whale</td>
<td>60</td>
</tr>
<tr>
<td>Blue whale</td>
<td>80</td>
</tr>
</tbody>
</table>

16. Is the sei whale or fin whale longer?
17. Which is shorter: the right whale or the blue whale?
18. China has 4,639 movie theaters. France has 4,365. Which country has more?

Replace each \(\_\) with \(<\), \(>\), or \(=\) to make a true sentence.

19. 8.9 \(\_\) 8.2  20. 0.15 \(\_\) 0.4
21. 1.251 \(\_\) 1.201  22. 0.7 \(\_\) 0.700

Order each set of numbers from least to greatest.

23. 0.0403, 0.4003, 0.0043, 4.0003
24. 2.587, 2.43, 2.09, 2.23, 2.568

25. **WRITE MATH** The table shows tips that a server earned for four days.

<table>
<thead>
<tr>
<th>Day</th>
<th>Tips ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>$40.98</td>
</tr>
<tr>
<td>Tuesday</td>
<td>$55.30</td>
</tr>
<tr>
<td>Wednesday</td>
<td>$46.20</td>
</tr>
<tr>
<td>Thursday</td>
<td>$36.50</td>
</tr>
</tbody>
</table>

On which day(s) did the server earn more than $46? Explain.
Normal body temperature for humans is between 97.8°F and 99.0°F. Which of the following numbers is NOT between 97.8 and 99.0?

A. 97.85       C. 98.74
B. 97.91       D. 99.01

Read the Test Item
Use place value to look for numbers that are between 97.8 and 99.0.

Solve the Test Item
Rename 97.8 as 97.80 and 99.0 as 99.00. Use place value to order the numbers.

\[
\begin{align*}
97.80 &< 97.85 \\
97.85 &< 97.91 \quad \text{range of body temperature} \\
97.91 &< 98.74 \\
98.74 &< 99.00 \\
99.00 &< 99.01
\end{align*}
\]

So, 99.01 is NOT between 97.8 and 99.0. The answer is D.

Read each question. Then fill in the correct answer on the answer sheet provided by your teacher or on a sheet of paper.

1. At a school function, there are 12 parents for every 1 teacher. If there are 72 parents at the function, how many teachers are there?
   A. 5       C. 7
   B. 6       D. 8

2. Start with 168,905.252. Increase the digit in the ten thousands place by 3, and decrease the thousandths digit by 2. What number results?
   F. 148,905.234       H. 198,905.232
   G. 171,905.250       I. 198,905.250
3. **SHORT RESPONSE** Write the number of students in the fifth grade in word form.

<table>
<thead>
<tr>
<th>Grade Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
</tr>
<tr>
<td>5th Grade</td>
</tr>
<tr>
<td>6th Grade</td>
</tr>
</tbody>
</table>

4. What fraction is equivalent to the decimal 0.058?
   A. \( \frac{58}{10} \)
   B. \( \frac{58}{100} \)
   C. \( \frac{58}{1000} \)
   D. \( \frac{58}{10000} \)

5. The population of the city where Lydia lives is eight million, six hundred twenty thousand, four hundred one. Which is the standard form of this number?
   F. 8,602,401
   G. 8,620,401
   H. 8,620,410
   I. 80,620,401

6. **GRIDDED RESPONSE** Eduardo wants to save $770 to buy a new refrigerator. He saves $110 per month. How many months it will take him to save enough money?

7. What portion of the squares is shaded? Express your answer as a decimal and a fraction.
   A. 0.25, \( \frac{25}{100} \)
   B. 0.4, \( \frac{40}{100} \)
   C. 0.6, \( \frac{60}{100} \)
   D. 0.75, \( \frac{75}{100} \)

8. **SHORT RESPONSE** A machinist needs to cut a hole with a diameter of twenty-nine thousandths inch. By mistake, he cuts the hole 0.03 inch. Did he cut the hole too large or too small? Explain.

9. The distance across many human cells can be measured in millionths of a meter. The cell shown below is fourteen millionths meter across. Which of the following is fourteen millionths in standard form?
   F. 0.00014
   G. 0.000014
   H. 14
   I. 14,000,000

**NEED EXTRA HELP?**

If You Missed Question . . .

<table>
<thead>
<tr>
<th>Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>For help with . . .</td>
<td>GLE 1.2</td>
<td>SPI 2.1</td>
<td>SPI 2.1</td>
<td>SPI 2.7</td>
<td>SPI 2.1</td>
<td>GLE 1.2</td>
<td>SPI 2.1</td>
<td>SPI 2.1</td>
<td>SPI 2.1</td>
</tr>
</tbody>
</table>