

# Discover!

# Math

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## Lesson 4

# Comparing Decimals

By the end of this lesson, you will be able to:

- compare decimals to the thousandths

## Lesson Review

If you need to review the value of digits in decimal numbers, please go to the lesson titled “Decimal Place Value.”

## Academic Vocabulary

Read the following vocabulary word and definition. Look through the lesson. Can you find the vocabulary word? Underline the vocabulary word in your lesson, and write the page number where you found the word on the blank here.

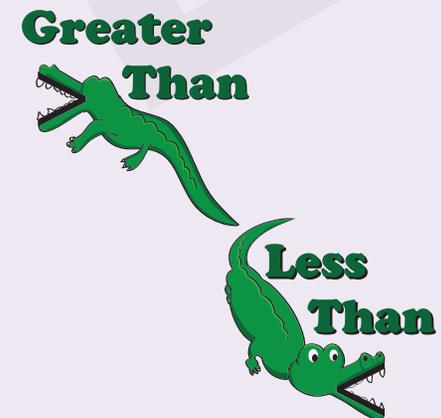
- **compare:** identifying whether a number is greater than, less than, or equal to another number (page \_\_\_\_)

## Materials Needed

base 10 blocks, paper, markers, scissors



Use paper and markers to create your own greater than and less than alligator symbols. Look at the example shown.



Cut out the alligator symbols you created. Next, cut three sheets of paper into four squares. Then, write one number on each square from 1 to 12. Place one or more numbers in front of you, to the left, and to the right. Now, place the correct alligator symbol in the middle to show which number is *greater than* or *less than*.

Remember, the alligator is hungry, so he always eats the bigger number!

# EXPLORE

As an engineer, you already started to solve some of the problems in the world. You thought about how many people are in the world and how that affects structures and systems like skyscrapers and bridges.

Now, it's time to design a better water system to make sure the world's growing population has access to safe and clean water.



## SHARPEN YOUR SKILLS

Go to the digital content for this lesson to practice the multiplication facts for five. You can practice with digital flash cards and take a quiz. If you do not have access to the digital content, you can use physical flash cards to practice the facts.

People use a lot of water! Think about every time you wash your hands and how much water that uses. Look at this data of water usage from three houses in Mexico City.

House 1 uses 1.48 gallons of water per hand washing.

House 2 uses 1.4 gallons of water per hand washing.

House 3 uses 1.492 gallons of water per hand washing.

How can you determine which house uses the least amount of water?

Which house uses the most water?

2

Which number is the greatest?

## Compare Decimals Using Place Value

Before you can find the house that uses the least amount of water, you need to learn how to compare decimals. **Compare** means to identify whether a number is greater than, less than, or equal to another number.

What do you notice about the three houses?

- 1.48 gallons of water per hand washing
- 1.4 gallons of water per hand washing
- 1.492 gallons of water per hand washing

You may notice all three numbers have a decimal point, use a different number of digits, and contain the numbers one and four.

Put the numbers in a place value chart to take a closer look at each decimal.

	ONES	.	TENTHS	HUNDREDTHS	THOUSANDTHS
House 1	1	.	4	8	
House 2	1	.	4		
House 3	1	.	4	9	2

First, look at the gallons of water used by House 1 and House 2. Both houses have digits in the ones place and tenths place, but some of the other boxes are empty. House 1 has a digit in the hundredths place, but House 2 does not. In order to easily compare the two numbers, put a zero in the hundredths place of House 2. Now, both numbers have the same number of digits.

	ONES	.	TENTHS	HUNDREDTHS
House 1	1	.	4	8
House 2	1	.	4	0

Compare the two decimal numbers.

1. Start in the ones place. They both have a value of 1.
2. Next, look at the tenths place. They both have a value of  $\frac{4}{10}$  or 0.4.
3. Last, look at the hundredths place. House 1 has a value of  $\frac{8}{100}$  or 0.08. House 2 has a value of  $\frac{0}{100}$  or 0.00.  $\frac{8}{100}$  is greater than  $\frac{0}{100}$ .

Therefore, 1.48 is greater than 1.40. You can also show this comparison by writing  $1.48 > 1.4$ .

# PRACTICE

## Compare Decimals Using Place Value

On a separate sheet of paper, create a place value chart to compare each pair of decimals below. Write the  $>$ ,  $<$ , or  $=$  symbols in the spaces below. Remember, the alligator always eats the bigger number!

1.  $1.7$  \_\_\_\_  $1.73$
2.  $5.23$  \_\_\_\_  $5.28$
3.  $7.4$  \_\_\_\_  $1.92$
4.  $8.37$  \_\_\_\_  $8.3$
5. Explain why  $4.3$  is equal to  $4.30$ .

.....

.....

6. Explain why  $5.67$  is less than  $5.9$ .

.....

.....

## Comparing Decimals to the Thousandths Place

Next, compare the gallons of water used by House 1 and House 3. This time, add a zero in the thousandths place of House 1. Now, both numbers have the same number of digits.

	ONES	.	TENTHS	HUNDREDTHS	THOUSANDTHS
House 1	1	.	4	8	0
House 3	1	.	4	9	2

You are ready to compare!

1. Start in the ones place. They both have a value of 1.
2. Next, look at the tenths place. They both have a value of  $\frac{4}{10}$  or 0.4.
3. Then, look at the hundredths place. House 1 has a value of  $\frac{8}{100}$  or 0.08. House 3 has a value of  $\frac{9}{100}$  or 0.09.  $\frac{8}{100}$  is less than  $\frac{9}{100}$ .
4. Stop right there! You don't need to look at the thousandths place in this example. You already have your answer.

1.480 is less than 1.492 because  $\frac{8}{100}$  is less than  $\frac{9}{100}$ .

You can also show this comparison by writing  $1.48 < 1.492$ .

## PRACTICE Comparing Decimals to the Thousandths Place

Use a place value chart to compare each pair of decimals. Write the  $>$ ,  $<$ , or  $=$  symbols in the spaces below.

1. 6.37 \_\_\_\_ 6.374
2. 7.281 \_\_\_\_ 7.23
3. 1.6 \_\_\_\_ 1.679
4. 5.64 \_\_\_\_ 5.641
5. Explain why 7.500 is equal to 7.5.

6. Explain why 2.317 is greater than 2.31.

## TAKE A CLOSER LOOK

Look at this race. You can clearly see who comes in first place, but it looks like there's a tie between runners 5 and 6 for second place.



To see who came in second, compare their times by filling in any empty spaces with zeros.

Runner 5 - 14.780

Runner 6 - 14.785

Now, as you move from left to right, you see that all the digits are the same until you get to the thousandths place.  $\frac{0}{1000}$  is less than  $\frac{5}{1000}$ . Therefore, 14.78 is the smaller number, or the fastest time.

Runner 5 came in second!

## Compare and Order Decimals

Now that you know how to compare two decimal numbers, you can compare multiple decimals by putting them in order from least to greatest or greatest to least.

Remember the engineer's problem? They need to find a design to bring safe and clean water to the growing population in Mexico City. You still haven't figured out which house uses the least amount of water. Compare the gallons of water used per hand washing for all three houses. Then, put them in order from least to greatest.

First, put the numbers in a place value chart and fill the empty spaces with zeros.

	ONES	.	TENTHS	HUNDREDTHS	THOUSANDTHS
House 1	1	.	4	8	0
House 2	1	.	4	0	0
House 3	1	.	4	9	2

Now, order the decimals from *least to greatest*.

- Start at the ones place. They all have a value of 1.
- Move to the tenths place. They all have a value of  $\frac{4}{10}$  or 0.4.
- Move to the hundredths place. The numbers have different values.  $\frac{0}{100}$  is the least, then  $\frac{8}{100}$ .  $\frac{9}{100}$  is the greatest.

1.4 is the smallest decimal number in the place value chart because there is a 0 in the hundredths place. House 2 has the smallest number of gallons and uses the least amount of water per hand washing.

Now, place the numbers in order from least to greatest:

1.4, 1.48, 1.492

Here, you can see that House 2 uses the least amount of water. House 3 uses the greatest amount of water.

## Compare and Order Decimals

Use a place value chart to compare and order each set of decimals. Write the decimals in order from least to greatest on the lines.

1. 1.4, 1.82, 1.367

\_\_\_\_\_

2. 12.63, 12.65, 12.682

\_\_\_\_\_

3. 6.5, 6.7, 6.231, 6

\_\_\_\_\_

4. 3.5, 2.103, 3.56, 2.163

\_\_\_\_\_

5. True or False House 3 uses the most water because it has the most digits.  
Explain your reasoning.

.....  
.....

## IN THE REAL WORLD

Every year in Alaska, people guess when the ice in this river will break apart.



To help people make their guesses, they measure the thickness of the ice every few days. In 2022, the measurements were 31.3 inches on April 11th, 30.25 inches on April 13th, and 32.2 inches on April 18th.

Which date had the thinnest ice?

# PRACTICE

## Comparing Energy Use

---

With the world's population growing, people use more water and more electricity. As an engineer, you need to help find the best ways to conserve water and energy. Most homes have at least one television. Even when a TV is turned off, it still uses some energy. Imagine you are looking at the data of seven different TVs. Find which TV uses the least amount of watts and the greatest amount of watts.

TV 1 - 1.252      TV 2 - 1.168      TV 3 - 1.257      TV 4 - 1.31  
TV 5 - 1.207      TV 6 - 1.29      TV 7 - 1.2

Help the engineers by organizing the TV's energy usage in the place value chart. Remember, fill any empty boxes with zeros.

	ONES	.	TENTHS	HUNDRETHS	THOUSANDTHS
TV 1		.			
TV 2		.			
TV 3		.			
TV 4		.			
TV 5		.			
TV 6		.			
TV 7		.			

# PRACTICE

## Comparing Energy Use (cont.)

Compare the TVs energy use. Show your reasoning by using the symbols  $<$  or  $>$  to compare the decimal numbers, and then write your answer on the line at the end of each question.

Example: Which TV has the greater energy use, TV 2 or TV 7? TV 7

$$1.168 < 1.2$$

1. Which TV has the greater energy use, TV 5 or TV 7? \_\_\_\_\_

\_\_\_\_\_  \_\_\_\_\_

2. Which TV has the greater energy use, TV 2 or TV 6? \_\_\_\_\_

\_\_\_\_\_  \_\_\_\_\_

3. Which TV has the greater energy use, TV 1 or TV 3? \_\_\_\_\_

\_\_\_\_\_  \_\_\_\_\_

4. Which TV has the greater energy use, TV 4 or TV 7? \_\_\_\_\_

\_\_\_\_\_  \_\_\_\_\_

5. Order the decimal numbers from greatest to least.

## REVIEW

In this lesson, you learned:

- Decimals can be compared by listing them in order from least to greatest or greatest to least using a place value chart.
- Before comparing two or more decimals, add zeros in the empty place value spaces so each number has the same number of digits.
- When comparing decimals, move from left to right and compare the value of each digit.

### Think About It

Why is it important to compare decimals? What other real-world scenarios would this skill be useful for?

## Number and Operations in Base 10

Compare the whole numbers using the symbols  $<$ ,  $>$ , or  $=$ .

1. 53,104 \_\_\_\_ 53,582
2. 4,204,375 \_\_\_\_ 4,248,295
3. 695,498 \_\_\_\_ 695,496
4.  $4,000 + 500 + 60 + 2$  \_\_\_\_ 4,571
5. 923 \_\_\_\_ nine hundred thirty-three
6. three hundred twenty-seven \_\_\_\_ 327

## Number and Operations: Fractions

Compare the whole numbers using the symbols  $<$ ,  $>$ , or  $=$ .

1.  $\frac{1}{3}$  \_\_\_\_  $\frac{1}{4}$
2.  $\frac{3}{5}$  \_\_\_\_  $\frac{1}{5}$
3.  $\frac{4}{12}$  \_\_\_\_  $\frac{1}{3}$
4.  $\frac{1}{100}$  \_\_\_\_  $\frac{1}{10}$
5.  $\frac{2}{7}$  \_\_\_\_  $\frac{7}{8}$
6.  $\frac{3}{10}$  \_\_\_\_  $\frac{6}{100}$

Compare each decimal number using  $<$ ,  $>$ , or  $=$ .

1.  $5.6$  \_\_\_  $5.62$
2.  $8.74$  \_\_\_  $8.74$
3.  $9.63$  \_\_\_  $9.7$
4.  $2.5$  \_\_\_  $2.49$
5.  $9.12$  \_\_\_  $9.12$
6.  $14.63$  \_\_\_  $15.6$
7.  $6.268$  \_\_\_  $6.263$
8.  $9.259$  \_\_\_  $9.25$
9.  $21.53$  \_\_\_  $21.506$
10.  $7.268$  \_\_\_  $7.4$

Compare the decimals. Put them in order from *least* to *greatest*.

11.  $13.5$ ,  $13$ ,  $14.2$ ,  $13.567$ ,  $13.62$

\_\_\_\_\_

12.  $8.42$ ,  $8.429$ ,  $8.4$ ,  $8.53$ ,  $8.427$

\_\_\_\_\_

Read the word problem and compare the decimals to solve.

13. Zoe is a meteorologist studying weather in her city. After a rainstorm, she collects data on the amount of rain that fell in three places:

- airport:  $13.62$  cm
- high school:  $13.618$  cm
- hospital:  $14.9$  cm

Which location had the least amount of rainfall? Explain your reasoning.

.....

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