

10.1.1.3: Comparing Whole Numbers

Learning Objectives

- Use $>$ or $<$ to compare whole numbers.

Introduction

There will be times when it's helpful to compare two numbers and determine which number is greater, and which one is less. This is a useful way to compare quantities such as travel time, income, or expenses. The symbols $<$ and $>$ are used to indicate which number is greater, and which is less than the other.

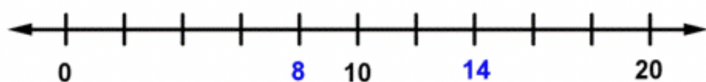
Comparing Whole Numbers

When comparing the values of two numbers, you can use a number line to determine which number is greater. The number on the right is always greater than the number on the left. In the example below, you can tell that 14 is greater than 8 because 14 is to the right of 8 on the number line.

✓ Example

Which number is greater, 8 or 14?

Solution



14 is to the right of 8, so 14 is greater than 8.

14 is greater than 8.

In the example below, you can determine which number is greater by comparing the digits in the ones place value.

✓ Example

Which number is greater, 33 or 38?

Solution

In both 33 and 38, the digit in the tens place is 3.

Because they have the same number in the tens place, you can determine which one is greater by comparing the digits in the ones place.

In the number 38, the digit in the ones place is 8.

In the number 33, the digit in the ones place is 3.

Because 8 is greater than 3, 38 is greater than 33.

38 is greater than 33. This answer was obtained from comparing their digits in the ones place value, which are 8 and 3, respectively.

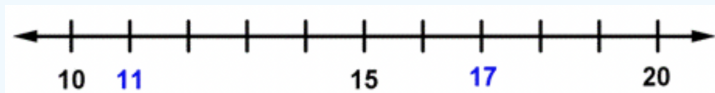
? Exercise

Which number is greater, 17 or 11?

- A. 17
- B. 11

Answer

- A. Correct. The number 17 is 6 units to the right of 11 on the number line.
- B. Incorrect. The number 11 is to the left of 17 on the number line, so 17 is greater. The correct answer is 17.



If one number is significantly greater than another number, it may be difficult to compare the numbers effectively with a number line. In general, **whole numbers** with more digits are greater than whole numbers with fewer digits. For example, 542 is greater than 84 because 542 has the digit 5 in the hundreds place. There are no hundreds in 84.

? Exercise

Which number is greater, 71 or 710?

- A. 71
- B. 710

Answer

- A. Incorrect. You can see that there is no digit in the hundreds place, which means that 71 is less than 710. The correct answer is 710.
- B. Correct. The number 710 has 7 hundreds, but 71 has no hundreds.

Inequalities

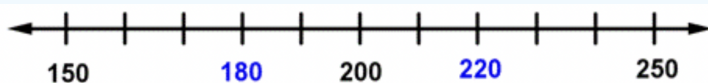
An **inequality** is a mathematical sentence that compares two numbers that aren't equal. Instead of an equal sign ($=$), inequalities use greater than ($>$) or less than ($<$) symbols. The important thing to remember about these symbols is that the small end points towards the lesser number, and the larger (open) end is always on the side of the greater number.

There are other ways to remember this. For example, the wider part of the symbol represents the jaws of an alligator, which "gobbles up" the greater number. So "35 is greater than 28" can be written as $35 > 28$, and "52 is less than 109" can be written as $52 < 109$.

✓ Example

Replace the question mark with $<$ or $>$ to make a true sentence: $180 ? 220$.

Solution



180 is to the left of 220, so $180 < 220$. The symbol points at 180, which is the lesser number.

$$180 < 220$$

? Exercise

Which expression correctly compares the numbers 85 and 19?

- A. $85 < 19$
- B. $19 = 85$
- C. $85 > 19$
- D. $19 > 85$

Answer

- A. Incorrect. The symbol should point at the lesser number, 19. On a number line, 85 is to the right of 19, so 85 is greater than 19. The correct answer is $85 > 19$

- B. Incorrect. This symbol says that 85 is equal to 19, which is false. On a number line, 85 is to the right of 19, so 85 is greater than 19. The correct answer is $85 > 19$.
- C. Correct. The open part of the symbol faces the larger number, 85, and the symbol points at the smaller number, 19.
- D. Incorrect. The symbol should point at the smaller number, 19. On a number line, 85 is to the right of 19, so 85 is greater than 19. The correct answer is $85 > 19$.

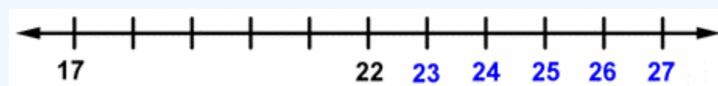
Many times, an answer needs to be a range of values rather than just a single value. For example, you want to make more than \$22 an hour. This can be expressed as all numbers greater than 22. See the example below.

✓ Example

? > 22. What whole number(s) will make this statement true?

Solution

The symbol points at 22, so the numbers you want to replace the question mark with are *greater* than 22. There are many numbers that work.



23, 24, 25, 26 and any additional whole numbers that are greater than 26 make this statement true.

? Exercise

A farmer has produced 230 pumpkins for the autumn harvest. Last year, he produced 198. Write an expression that compares these two numbers.

- A. $230 > 198$
- B. $230 < 198$
- C. $198 = 230$
- D. $198 > 230$

Answer

- A. Correct. 230 is greater than 198, and this is reflected in the symbol because the open part of the symbol faces 230.
- B. Incorrect. 230 is greater than 198, and the symbol is pointing in the wrong direction, with the open part facing the lesser number. The correct answer is $230 > 198$.
- C. Incorrect. This statement says that 198 is equal to 230, which is incorrect. The correct answer is $230 > 198$.
- D. Incorrect. 230 is greater than 198, and the symbol is pointing in the wrong direction, with the open part facing the lesser number. The correct answer is $230 > 198$.

Summary

To compare two values that are not the same, you can write an inequality. You can use a number line or place value to determine which number is greater than another number. Inequalities can be expressed using greater than ($>$) or less than ($<$) symbols.

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