

Lesson 12: The Relationship Between Absolute Value and Order

Classwork

Opening Exercise

Record your integer values in order from least to greatest in the space below.

Example 1: Comparing Order of Integers to the Order of Their Absolute Values

Write an inequality statement relating the ordered integers from the Opening Exercise. Below each integer write its absolute value.

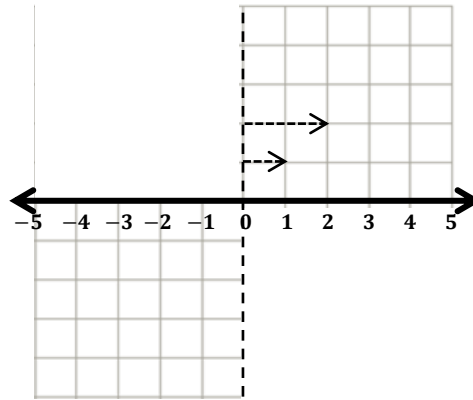
Rewrite the integers that are not circled in the space below. How do these integers differ from the ones you circled?

Rewrite the negative integers in ascending order and their absolute values in ascending order below them.

Describe how the order of the absolute values compares to the order of the negative integers.

Example 2: The Order of Negative Integers and Their Absolute Values

Draw arrows starting at the dashed line (zero) to represent each of the integers shown on the number line below. The arrows that correspond with 1 and 2 have been modeled for you.



As you approach zero from the left on the number line, the integers _____, but the absolute values of those integers _____. This means that the order of negative integers is _____ the order of their absolute values.

Exercise 1

Complete the steps below to order these numbers:

$$\left\{ 2.1, -4\frac{1}{2}, -6, 0.25, -1.5, 0, 3.9, -6.3, -4, 2\frac{3}{4}, 3.99, -9\frac{1}{4} \right\}.$$

- Separate the set of numbers into positive values, negative values, and zero in the top cells below (order does not matter).
- Write the absolute values of the rational numbers (order does not matter) in the bottom cells below.

<div style="border: 2px solid orange; border-radius: 50%; padding: 20px; margin-bottom: 10px;">Negative Rational Numbers</div> <div style="border: 2px solid orange; border-radius: 50%; padding: 20px;">Absolute Values</div>	Zero 0	<div style="border: 2px solid orange; border-radius: 50%; padding: 20px; margin-bottom: 10px;">Positive Rational Numbers</div> <div style="border: 2px solid orange; border-radius: 50%; padding: 20px;">Absolute Values</div>
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- c. Order each subset of absolute values from least to greatest.

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- d. Order each subset of rational numbers from least to greatest.

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- e. Order the whole given set of rational numbers from least to greatest.

Exercise 2

- a. Find a set of four integers such that their order and the order of their absolute values is the same.
- b. Find a set of four integers such that their order and the order of their absolute values are opposite.
- c. Find a set of four non-integer rational numbers such that their order and the order of their absolute values is the same.
- d. Find a set of four non-integer rational numbers such that their order and the order of their absolute values are opposite.
- e. Order all of your numbers from parts (a)–(d) in the space below. This means you should be ordering 16 numbers from least to greatest.

Lesson Summary

The absolute values of positive numbers will always have the same order as the positive numbers themselves. Negative numbers, however, have exactly the opposite order as their absolute values. The absolute values of numbers on the number line increase as you move away from zero in either direction.

Problem Set

1. Micah and Joel each have a set of five rational numbers. Although their sets are not the same, their sets of numbers have absolute values that are the same. Show an example of what Micah and Joel could have for numbers. Give the sets in order and the absolute values in order.

Enrichment Extension: Show an example where Micah and Joel both have positive and negative numbers.

2. For each pair of rational numbers below, place each number in the Venn diagram based on how it compares to the other.

- a. $-4, -8$
- b. $4, 8$
- c. $7, -3$
- d. $-9, 2$
- e. $6, 1$
- f. $-5, 5$
- g. $-2, 0$

