



## Lesson 12: The Relationship Between Absolute Value and Order

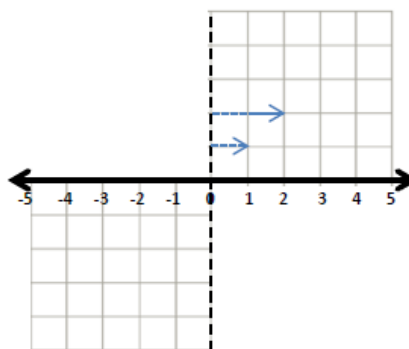
### Student Outcomes

- Students understand that the order of positive numbers is the same as the order of their absolute values.
- Students understand that the order of negative numbers is the opposite order of their absolute values.
- Students understand that negative numbers are always less than positive numbers.

Jan 13-11:02 PM

### 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.

Jan 13-11:00 PM

**Exercise 1**

Complete the steps below to order these numbers:

~~$\{-1, -\frac{1}{2}, 6, 8, 5, -5, 0, -9, -3, 4, \frac{3}{4}, 3.99, -9\frac{1}{4}\}$~~

$| -4\frac{1}{2} | = 4\frac{1}{2}$   
 $| 4\frac{1}{2} | = 4\frac{1}{2}$

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

<p>Negative Rational Numbers</p> <p><math>-4\frac{1}{2}, -6, -1.5, -6.3,</math>  <math>-4, -9\frac{1}{4}</math></p>	<p>Zero</p> <p>0</p>	<p>Positive Rational Numbers</p> <p><math>2.1, 0.25, 3.9,</math>  <math>2\frac{3}{4}, 3.99,</math></p>
<p>Absolute Values</p> <p><math>4\frac{1}{2}, 6, 1.5, 6.3,</math>  <math>4, 9\frac{1}{4}</math></p>		<p>Absolute Values</p> <p><math>2.1, 0.25, 3.9</math>  <math>2\frac{3}{4}, 3.99</math></p>

Jan 13-11:00 PM

- c. Order each subset of absolute values.

$9\frac{1}{4}, 6.3, 6, 4\frac{1}{2}, 4, 1.5$        $3.99, 3.9, 2\frac{3}{4}, 2.1, 0.25$

- d. Order each subset of rational numbers.

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

- e. Order the whole given set of rational numbers.

Jan 13-11:01 PM

Exercise 2

- a. Find a set of four integers such that their order and that of the order of their absolute values is the same.

2, 4, 6, 8  
2, 4, 6, 8

- b. Find a set of four integers such that their order and the order of their absolute values are opposite.

-2, -4, -6, -8  
8, 6, 4, 2

- c. Find a set of four non-integer rational numbers such that their order and the order of their absolute values is the same.

$1\frac{1}{2}, 2\frac{1}{2}, 3\frac{1}{2}, 4\frac{1}{2}$   
 $1\frac{1}{2}, 2\frac{1}{2}, 3\frac{1}{2}, 4\frac{1}{2}$

- d. Find a set of four non-integer rational numbers such that their order and the order of their absolute values are opposite.

$-7\frac{1}{2}, -5\frac{1}{2}, -3\frac{1}{2}, -1\frac{1}{2}$   
 $1\frac{1}{2}, 3\frac{1}{2}, 5\frac{1}{2}, 7\frac{1}{2}$

- 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.

Jan 13-11:01 PM

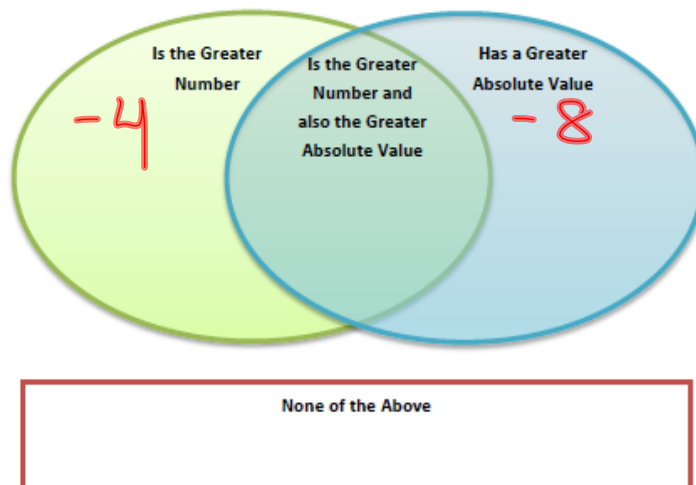
Problem Set

- ~~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.

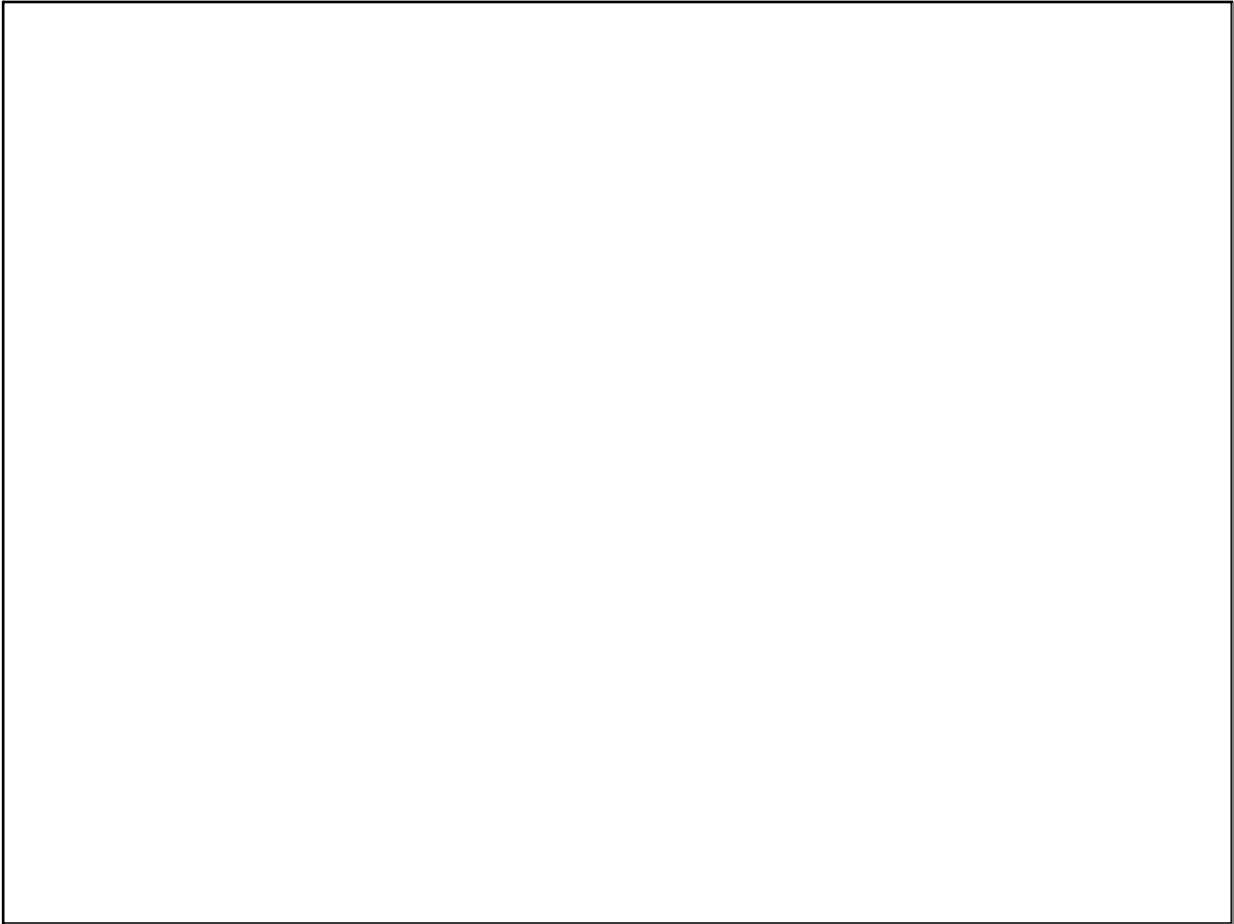
~~Enrichment Extension:~~ Show an example where Micah and Joel both have positive and negative numbers.

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

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



Jan 13-11:02 PM



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