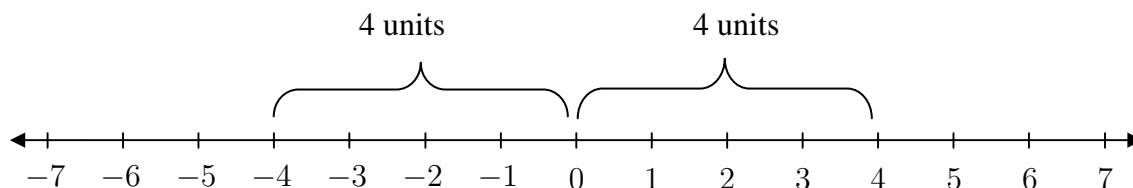Tallahassee Community College

Opposite Numbers and Absolute Value

Opposite Numbers

Two numbers which are the same distance from zero, but on opposite sides of zero, are called opposites.

−4 and 4 are both 4 units from zero on the number line; therefore 4 and −4 are opposites of each other.

The negative sign can be read as "the opposite of."
NOTE that the opposite of a positive number is always negative and the opposite of a negative number is always positive.

Absolute Value

The absolute value of a number is the number of units that the number is from zero on the number line. Absolute value only measures distance. For this reason, absolute value <u>cannot be negative</u> (Study page 5 in your text book).
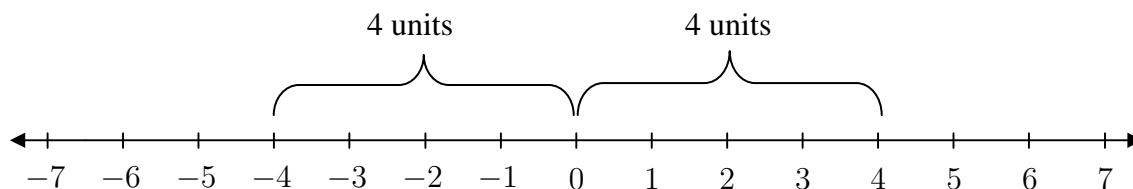
4 is four units from zero therefore the absolute value of 4 is 4, written $|4| = 4$

NOTE that −4 is also four units from zero therefore the absolute value of −4 is 4, written $|-4| = 4$.

The absolute value of a positive number is the number itself.

$$|3| = 3 \qquad\qquad |9| = 9 \qquad\qquad |23| = 23$$

The absolute value of a negative number is the opposite of that number.

$$|-2| = 2 \qquad\qquad |-10| = 10 \qquad\qquad |-45| = 45$$

The absolute value of zero is zero. $\qquad |0| = 0$

<u>REMEMBER!</u> Absolute value only measures distance and it can <u>never</u> be negative!

Sometimes you will need to find the opposite of the absolute value of a number. When you evaluate these problems the answers will always be negative because it is always the opposite of the absolute value, and the absolute value itself will be a positive number.

$-|9|$ is read as the "opposite of the absolute value of positive nine".

$$-|9| = -(9) = -9$$
opposite
Absolute value

$-|-3|$ is read as the "opposite of the absolute value of negative three".

$$-|-3| = -(3) = -3$$
opposite
Absolute value

Be sure you can tell the difference between the opposite of a number and the opposite of the absolute value of a number.

a. $-(6) = -6$ and $-|6| = -6$

b. $-(-6) = 6$ but $-|-6| = -6$

the opposite of   the opposite of the absolute value
a negative number   of a negative number

Order and Absolute Value

Place the correct symbol, $<$ or $>$, between the two numbers.

Example 1

$$|3| \quad |-5|$$

First write the absolute values, then write the correct order symbol between the number.

$$|3| = 3 \qquad\qquad |-5| = 5 \qquad\qquad 3 < 5$$

Therefore

$$|3| < |5|$$

Example 2

$$\left|-4\right| \quad \left|-2\right|$$

You may do this step mentally

$$4 \ > \ 2$$

Therefore

$$\left|-4\right| \ > \ \left|-2\right|$$
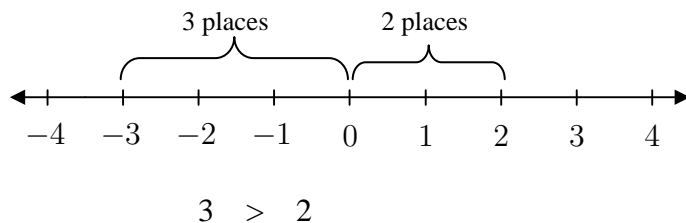
Do not confuse these two questions:

Use < or > to make a true statement.

1. $\left|-3\right|$ $\left|2\right|$
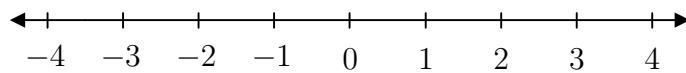
Only the distances are compared in this problem

$$3 \ > \ 2$$

−3 is a greater distance from 0 than 2

.

2.   −3   2

The placement on the number line is used to answer this problem.
−3 is to the left of 2

$$-3 \ < \ 2$$

Note: In the next section, you will need to know which number has the greater absolute value. You will use the method shown in problem 1.

EXERCISES

1. Evaluate.

   a. $-(3)$ e. $|6|$ i. $-(9)$

   b. $-|3|$ f. $|-4|$ j. $|-7|$

   c. $-(-2)$ g. $-|-8|$ k. $|10|$

   d. $-|-2|$ h. $-(-5)$ l. $-(14)$

2. Place the correct symbol, $<$ or $>$, between the two numbers.

   a. $|-5| \quad |7|$ b. $|6| \quad |-2|$ c. $|-4| \quad |-1|$

3. Which number has the greater absolute value?

   a. -5 or 3 b. -2 or 4

KEY

1.

a.	-3	d.	-2	g.	-8	j.	7
b.	-3	e.	6	h.	5	k.	10
c.	2	f.	4	i.	-9	l.	-14

2.   a. $<$ b. $>$ c. $>$

3.   a. -5 b.   4

   $|-5| > |3|$ $|4| > |-2|$

   Because $5 > 3$ Because $4 > 2$