I. **Opposites**

Opposites are two numbers that are the same distance from 0 but on opposite sides of 0.

-2 is two places to the left of 0.
2 is two places to the right of 0.

2 and -2 are opposites because they are both 2 places from 0 but they are on opposite sides of 0.

What is the opposite of 9? ___________
What is the opposite of -16? ___________

(The opposite of 9 is -9. The opposite of -16 is 16.)
The Opposite of zero is zero!

When a negative sign is written in front of a parentheses it can be read, "The opposite of the number inside ( )."

-(3) is read "the opposite of 3."

We simplify -(3) = -3

This says: the opposite of 3 is equal to negative 3.

-(-8) is read: "The opposite of negative eight."

We simplify: -(-8) = 8

We read: "The opposite of negative 8 is eight."

-(0) = 0

Says: "The opposite of zero is zero."

Zero is **not** positive (it isn't to the **right** of zero.)

Zero is **not** negative (it isn't to the **left** of zero.)

A signed number tells two things about the number's position on the number line:

- a. it's **distance** from zero (How far from 0)?
- b. it's **direction** from zero (Which side of 0)?

The **whole numbers and their opposites** are called the **INTEGERS**.
I. **PROBLEMS:**

1. Tell each number's distance and direction from zero.
   a. -7 is ____ places from 0; it is to the ______ of 0.
   b. 14 is ____ places from 0; it is to the ______ of 0.
   c. 0 is ____ places from 0; it is **at** 0.

2. Where are all negative numbers?____________________________

3. Where are all positive numbers?____________________________

4. What is the opposite of -23?_______________________________

5. What is the opposite of 47?_______________________________

6. Tell how each statement is read. Simplify the expression below it.
   a. -(-3) is read__________________________________________
      it is the same as______________________________________.
   b. -(45) is read__________________________________________
      it is the same as______________________________________.
   c. -(0) is read_______________________; it is simply 0.

II. Absolute Value

There are times when the only thing we need to know about a number is its distance from zero. We may not care about its direction from zero. This is called the absolute value of the number.

**REMEMBER:**

A signed number tells **two** things:

1. distance from 0
2. direction from 0

There are times when we will need to know only the **distance** of a number from 0.

The absolute value of a number tells only **one** thing:

1. distance from 0.

The absolute value of 9 is 9. (9 is 9 places from 0.)
The absolute value of -4 is 4. (-4 is 4 places from 0.)
The absolute value of 0 is 0. (0 is 0 places from 0.)

We work with the understanding that 9 and 4 don't tell which side of zero 9 and -4 are on. The **absolute value simply tells how far these numbers are from 0**.

There is a symbol used to say "the absolute value of." It is ||.
NOTICE this is not a curved parentheses - these lines are straight.

|3| is read, "The absolute value of 3."
|-8| is read, "The absolute value of negative 8."  NOTICE the negative sign is inside the ||.

To evaluate or simplify an absolute value of a number, think: "What is the number's distance from 0?" Do not tell which side of 0 the number is on.

Evaluate (find the value of)

1.  |3| = 3 (because 3 is 3 places from 0)
2.  |-8| = 8 (because -8 is 8 places from 0)

Do not confuse opposites and absolute values.

To find the opposite of any non-zero number, you just change its sign. (Doesn't that put it the same distance from zero but on the other side of zero?) The absolute value of a number will never be negative.

We know that a negative sign in front of a parentheses is read "The opposite of the number." Similarly, a negative sign in front of the absolute value symbol is read, "The opposite of the absolute value of the number." To evaluate the opposite of the absolute value of a number, you must first know the absolute value. Then you will give the opposite of that number. You will see that the opposite of the absolute value of any non-zero number will be negative.

EVALUATE:

-|9| is read, "The opposite of the absolute value of 9."

To evaluate, first think: To find the opposite of the absolute value of a number takes two steps:

|9| = 9

Then think: the opposite of 9 is -9

You will write: 1. Find the absolute value.

-|9| = -9

You will write: 2. Find the opposite of your first answer.

EVALUATE:

-|-6| This is read, "The opposite of the absolute value of negative 6." First think: |-6| = 6

Then think: "The opposite of 6 is -6."

You will write:  -|-6| = -6

-|0|  This is read: "The opposite of the absolute value of 0."

-|0| = 0

Start early in your study of algebra:
1.  Know all words used.
2.  Know the symbols.
Algebra is like a foreign language!
You must be able to read it and understand what you are being asked.
We will use the words **opposite** and **absolute value** in other sections
of your text.

**PART II - PROBLEMS:**

You are to do two things with each problem.
a. Tell how it is read.
b. Evaluate or simplify it.

1. \(-(9)\) \hspace{1cm} 4. \(|-28|\) \hspace{1cm} 7. \(-0\)

2. \(-(-12)\) \hspace{1cm} 5. \(-|-4|\) \hspace{1cm} 8. \(|0|\)

3. \(|34|\) \hspace{1cm} 6. \(-|5|\) \hspace{1cm} 9. \(-|0|\)

**KEY: PART I:**

1. a. 7, left \hspace{1cm} 5. -47
   b. 14, right \hspace{1cm} 6. a. "opposite of negative 3" is 3
      c. zero \hspace{1cm} b. "opposite of 45" is -45
2. left of 0 \hspace{1cm} c. "opposite of 0".
3. right of 0
4. 23

**KEY: PART II:** (The **ways the original problems are read** are inside parentheses.)

1. a. (The opposite of nine) \hspace{1cm} 5. a. (opposite of absolute
   b. -9 \hspace{1cm} \hspace{1cm} \hspace{1cm} \hspace{1cm} \hspace{1cm} value of negative 4)
2. a. (opposite of negative 12) \hspace{1cm} b. -4
   b. 12 \hspace{1cm} 6. a. (opposite of absolute
3. a. (absolute value of 34) \hspace{1cm} \hspace{1cm} \hspace{1cm} \hspace{1cm} \hspace{1cm} value of 5)
   b. 34 \hspace{1cm} b. -5
4. a. (absolute value of -28) \hspace{1cm} 7. a. (opposite of zero)
   b. 28 \hspace{1cm} b. 0
   8. a. (absolute value of zero)
   b. 0
9. a. (opposite of absolute \hspace{1cm} b. 0
   value of zero)

**NOTICE:** In 3 and 4, you found the absolute values; neither answer was negative. In 5 and 6, you found the opposite of the absolute values; both answers were negative. In 7, 8 and 9, the answers are all zero. Zero is never negative. (It isn't positive either).