**Unit 5- Absolute and Reciprocal Functions and Equations \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Lesson 7.1 Absolute Value and Lesson 7.2 Absolute Value Functions**

Specific Outcome 1. Demonstrate an understanding of the absolute value of real numbers

Specific Outcome 2. Graph and analyze absolute value functions (limited to linear and quadratic functions) to solve problems

**Definition:** The **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of any real number is *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.* It does not matter whether or not the direction on the number line is positive or negative; the absolute value is always read as a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_number.

The **absolute value** of any real number *x*  is written \_\_\_\_\_\_\_\_\_\_\_\_, and it represents the distance from *x* to 0 on the number line

* The absolute value of any number other than 0 is always \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* The absolute value of 0 is \_\_\_\_\_

Another way of writing this is as follows:



**Example 1:** Evaluate the following

a) 3 b) -7

**Your Turn:** Evaluate the following

a) 9 b) -12

**Example 2:** Write the real numbers in order from least to greatest.



**Your Turn:** Write the real numbers in order from least to greatest.



**Example 3:** Solve for each of the following:

a) 4 --6 b) 5 -32 -7 c) -2(5 – 7)2 + 6

**Your Turn:** Solve for each of the following:

a) 4 --3 b) -12 + 8 c) 12(-3) + 52

Here are a few more definitions:

Absolute Value Function:

Piecewise Function:

* A function composed of two or more separate functions or *pieces,* each with its own specific domain, that combine to define the overall function.
* the absolute value function y =xcan be defined as the piecewise function



**Example 4:**

**Graph an Absolute Value Function of the Form *y* = |*ax* + *b*|**

Consider the absolute value function *y* = |2*x* **–** 3|.

**a)** Determine the *y-*intercept and the *x-*intercept.

**b)** Sketch the graph.

**c)** State the domain and range.

**d)** Express as a piecewise function.



**Example 5:**

**Graph an Absolute Value Function of the Form *f* (*x*) = |*ax*2 + *bx* + *c*|**

Consider the absolute value function *f* (*x*) = |–*x*2 + 2*x* + 8|.

**a)** Determine the *y*-intercept and the *x-*intercepts.

**b)** Sketch the graph.

**c)** State the domain and range.

**d)** Express as a piecewise function.

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