Writing Process Strand

Standard 3: Prewriting

- LA.910.3.1.3
  The student will prewrite by using organizational strategies and tools (e.g., technology, spreadsheet, outline, chart, table, graph, Venn diagram, web, story map, plot pyramid) to develop a personal organizational style.

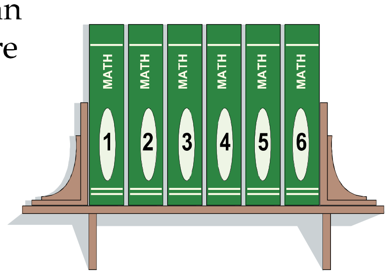
Standard 10: Mathematical Reasoning and Problem Solving

- MA.912.A.10.1
  Use a variety of problem-solving strategies, such as drawing a diagram, making a chart, guessing- and-checking, solving a simpler problem, writing an equation, working backwards, and creating a table.

- MA.912.A.10.3
  Decide whether a given statement is always, sometimes, or never true (statements involving linear or quadratic expressions, equations, or inequalities, rational or radical expressions, or logarithmic or exponential functions).

The Set of Real Numbers

A **set** is a collection. It can be a collection of DVDs, books, baseball cards, or even numbers. Each item in the *set* is called an **element** or **member** of the set. In algebra, we are most often interested in sets of numbers.



A set *can be a collection of books or numbers.*

The first set of numbers you learned when you were younger was the set of **counting numbers**, which are also called the **natural numbers**. These are the **positive numbers** you count with (1, 2, 3, 4, 5, …). Because this set has *no final number*, we call it an **infinite set**. A set that has a *specific number of elements* is called a **finite set**.

Symbols are used to represent sets. **Braces { }** are the symbols we use to show that we are talking about a set.

A set with *no elements* or members is called a **null set (ø)** or **empty set**. It is often denoted by an *empty set* of *braces* { }.

The set of *counting numbers* looks like {1, 2, 3, …}.

Remember: The counting numbers can also be called the *natural numbers*, naturally!

The set of natural number **multiples** of 10 is {10, 20, 30, …}.

The set of integers looks like {…, -4, -3, -2, -1, 0, 1, 2, 3, 4, …}.

The set of **integers** that are *multiples* of 10 is
{… , -30, -20, -10, 10, 20, 30, …}.

As you became bored with simply counting, you learned to add and subtract numbers. This led to a new set of numbers, the **whole numbers**.

The *whole numbers* are the counting numbers *and* zero
{0, 1, 2, 3, …}.

Remember getting negative answers? Those **negative numbers** made another set of numbers necessary. The *integers* are the counting numbers, their **opposites** (also called **additive inverses**), and zero.

The integers can be expressed (or written) as
{… , -3, -2, -1, 0, 1, 2, 3, …}.

Even integers are integers divisible by 2. The integers
{… , -4, -2, 0, 2, 4, …} form the set of *even integers*.

Remember: Every even integer ends with the **digit** 0, 2, 4, 6, or 8 in its ones (or units) place.

Odd integers are integers that are *not* divisible by 2. The integers {… , -5, -3, -1, 1, 3, 5, …} form the set of *odd integers*.

Remember: Every odd integer ends with the *digit* 1, 3, 5, 7, or 9 in its units place.

Note: There are *no* **fractions** or **decimals** listed in the set of integers above.

When you learned to divide and got answers that were *integers*, *decimals*, or *fractions*, your answers were all from the set of **rational numbers**.

> *Rational numbers* can be expressed as fractions that can then be converted to **terminating decimals** (with a *finite* number of digits) or **repeating decimals** (with an *infinitely* repeating sequence of digits). For example, $^{-}\frac{3}{5} = -0.6$, $\frac{6}{2} = 3$, $^{-}\frac{8}{4} = -2$ and $\frac{1}{3} = 0.333\ldots$ or $0.\overline{3}$.

As you learned more about mathematics, you found that some numbers are **irrational numbers**. *Irrational numbers* are numbers that cannot be written as a **ratio**, or a comparison of two quantities because their decimals never repeat a **pattern** and never end.

> *Irrational numbers* like **π (pi)** and $\sqrt{5}$ have non-*terminating*, non-*repeating decimals*.

If you put all of the rational numbers and all of the irrational numbers together in a set, you get the set of **real numbers**.

> The set of *real numbers* is often symbolized with a capital R.

A diagram showing the *relationships* among all the sets mentioned is shown on the following page.

Remember: Real numbers include all rational numbers and all irrational numbers.

The diagram below is called a **Venn diagram**. A *Venn diagram* shows the relationships between different sets. In this case, the sets are types of numbers.

The Set of Real Numbers