$N=\{1, 2, 3, …\}$ natural numbers or counting numbers

$W=\{0, 1, 2, 3,…\}$ whole numbers

\*all natural numbers are whole numbers

$I=\{…,-3, -2, -1, 0, 1, 2, 3,…\}$ integers, positive and negative whole numbers

\*all natural and whole numbers are integers

A **rational number** is any number that can be written in the form , where a and b are integers, and b cannot equal zero. OR  .

A rational number can be written as a:

|  |  |
| --- | --- |
| Form | Examples |
| Fraction  | 3, 0, -7,  |
| Decimal that terminates or has a repeating pattern | 7.4,,  |
| Percent that terminates or has a repeating pattern | 75.3%, % |

 \*all natural, whole and integers are rational

Numbers that cannot be written as the ratio of two integers are irrational numbers, $\overbar{Q}$. They are non-repeating or non-terminating decimals. eg. $π, \sqrt{7}$

$Q+\overbar{Q}$=$R$ all rational and irrational numbers together make up the real numbers

How the number systems are all related…

|  |
| --- |
|  |

A fraction is made up of two parts. The top of the fraction is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the bottom of the fraction is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. If the numerator is greater than the denominator, the fraction is called an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Example: ). These types of fractions can also be written as a whole number and a fraction. This is called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Example: ).

**Reducing Fractions to Lowest Terms**

When using fractions, your solutions must always be given in lowest terms.

In order to reduce a fraction to lowest terms, you have to find the greatest common factor (GCF) of (the greatest number that divides evenly into) the numerator and denominator.

|  |  |
| --- | --- |
| Example 1:  =  The factors of 9 are: { }The factors of 12 are: { }The GCF is \_\_\_\_\_\_\_\_\_. Simply divide the numerator and denominator by this number. These two fractions are also known as equivalent fractions. | Example 2:  =  The factors of 27 are { } The factors of 45 are { }The GCF is \_\_\_\_\_\_\_\_\_. |

**Try these:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| a.   | b.   | c.  | d.   | e.  |

**Converting Mixed Numbers into Improper Fractions**

To convert mixed numbers to improper fractions:  or 

|  |  |
| --- | --- |
| Example 3:  | Example 4:  |

**Try these:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| a.   | b.   | c.  | d.   | e.  |