

Name: \_\_\_\_\_

# Rational & Irrational Numbers { 1.0 }

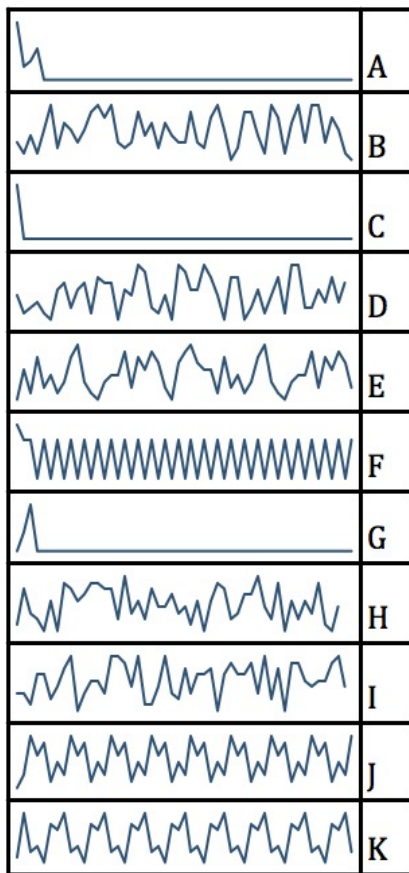
Secondary Math II Notes

**OBJECTIVE:** Know the definition of a rational number. Identify rational and irrational numbers.

### Challenge

#### Instructions:

Carefully review the figures on the left. Sort the figures into two groups (the letters are provided for your convenience). These figures may be sorted in many different ways, but be sure that you can give justification for your choice.



When we look at all of these figures carefully we can see that some of them will result in some sort of pattern (have some sort of order.) Others appear to be completely random and have no order at all. Sometimes a figure (figure E for example) may appear not to have any pattern, but upon a closer inspection we see that it does have some order. These more complex patterns do exist but they are more difficult to spot.

If we were to sort the figures using these criteria we would have a list like the following.

Figures with a pattern: A, C, E, F, G, J, K

Figures without a pattern: B, D, H, I

Another way to think of the figures with patterns is to recognize that it would be easy to predict what would happen next.

It turns out that these figures are actually graphs of several different numbers. Below is a list of numbers. See if you can match each number to it's corresponding figure. What observations can you make? If you were given the numbers without the figures, what would you do to sort them into those same groups?

### Rational & Irrational Numbers

$9\frac{4}{17}$	$\sqrt{17}$	0.25	$\sqrt{3}$	$9.7\overline{72}$	$\frac{15}{29}$	$1\frac{12}{13}$	$\pi$	$\sqrt{11}$	$\frac{2}{7}$	$8.\overline{3}$
A	D	G	H	F	E	K	B	I	J	C

### Definition

"A rational number is a number that can be expressed as the quotient  $\frac{p}{q}$ , where  $p$  and  $q$  are integers,  $q \neq 0$ , and  $p$  and  $q$  have no common divisors."

### In My Own Words

#### Rational:

A number is only rational if it can be written in fractional form (also know as a ratio, which is why we call them rational numbers). Numbers that are given as fractions are obviously rational. Numbers that are integers (...-3, -2, -1, 0, 1, 2, 3....) are rational because they can be written as a fraction by using a denominator of 1. Terminating decimals can be written as a fraction. (For example .2345 can be written as  $\frac{2345}{10000}$ ) Repeating decimals can also be written as fractions using a slightly more complex process. (for example .333333..... can be written as  $\frac{1}{3}$ ). It might be easier to define the IRRATIONAL numbers as those numbers that cannot be written as a fraction. They do not follow a pattern or have any order.