Math 104Q

Group Work on Sets of Numbers: Are Rationals Irrational?

Real numbers are rational or irrational. Rational numbers are numbers that can be expressed as fractions. For example, $4 = \frac{4}{1}$, $1.25 = \frac{5}{4}$, $\sqrt{25} = \frac{5}{1}$. Irrational numbers are any numbers that are real but not rational, For example, $\sqrt{3}$, π, $1.342169458\ldots$.

Now, how can you keep the names associated with the correct numbers. Look again at the words "rational" and "irrational", but this time think of them in terms of people — rational people and irrational people. Rational people make good judgments (supposedly) while irrational people make unusual decisions and are unpredictable. That's why we say they are irrational, you don't know what they will be doing next, or their behavior isn't "normal." Look again at these numbers and see if you have a new appreciation of the name of the set and the numbers in the set.

Rational Numbers	**Irrational Numbers**
Predictable, can be expressed as fractions.	Unusual, cannot predict what comes next.
$\sqrt{49} = 7$	$\sqrt{6} = 2.449489743\ldots$
4.2	$\pi = 3.1415922654\ldots$
$0.145145145145 = \frac{145}{949}$	$0.26438572865...$
-4	$-\sqrt{3}$

Develop a technique, method, strategy or "silly" method to identify the sets of natural numbers, whole numbers and integers. Remember, nothing is really "silly" if it helps you remember.

1. Natural numbers

2. Whole numbers

3. Integers

For the given set of numbers $\left\{-6,-\sqrt{5},-\frac{1}{3},0,\sqrt{4},\pi,5.623623623\ldots,7.92359174\ldots10,\frac{80}{7}\right\}$, identify the numbers that are:

4. Whole: _____.

5. Integers: _____.

6. Rational: _____.

7. Natural: _____.

8. Irrational: _____.

9. Which number(s) is/are in both the set of whole numbers and natural numbers?

10. Which number is a whole number but not a natural number?

11. Which numbers are both rational and irrational?
(Hint: Can a person be rational and rational at the same instant?)

12. Draw a Real Line. Plot all the numbers of this set on the Real Line.