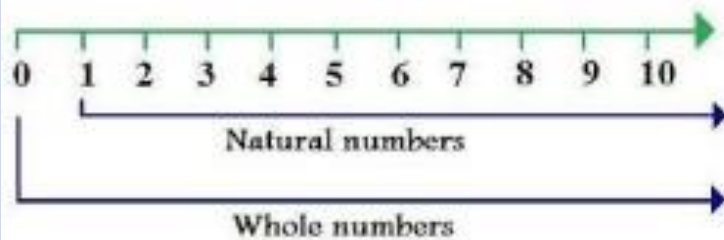


# THE REAL NUMBER SYSTEM

(It's about to get “real”)

# NATURAL NUMBERS



The set of numbers 1, 2, 3, 4, ... Also called counting numbers.

# WHOLE NUMBER



counting  
numbers such as  
1,2,3,4 and also  
zero

# INTEGERS



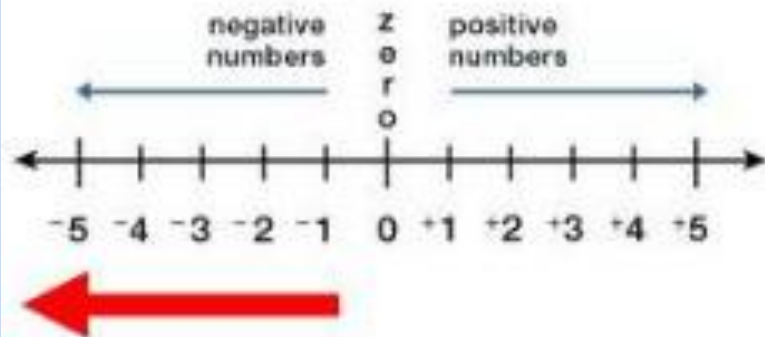
All whole  
numbers  
(both positive  
and negative)  
and zero.

# POSITIVE INTEGERS



whole  
numbers  
greater  
than zero

# NEGATIVE INTEGERS



any

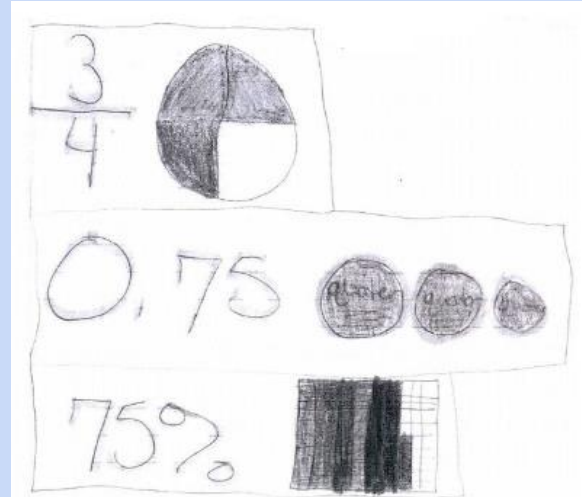
number

less than

zero

# RATIONAL NUMBERS

Any number that  
can be  
expressed as a  
fraction



# IRRATIONAL NUMBERS

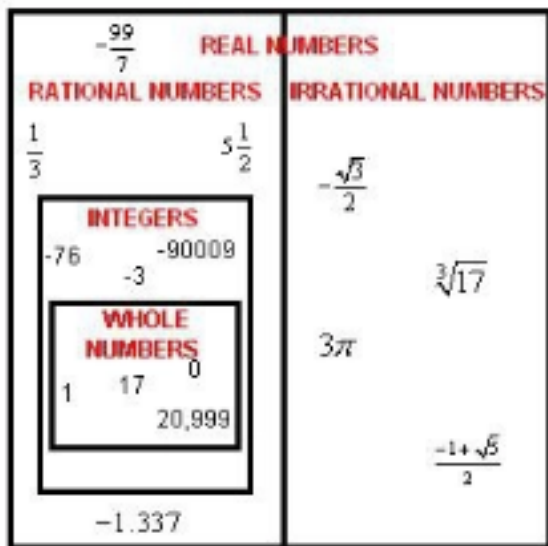
*irrational number*  $\Rightarrow \sqrt{19} \approx 4.35889\dots$

*rational number*  $\Rightarrow 0.5 = \frac{1}{2}$

numbers  
that can  
not be  
written as  
fractions



# REAL NUMBERS



the set of all  
rational and  
irrational  
numbers

# REPEATING DECIMAL

$$\frac{1}{9} = .11111111111111\dots$$

A decimal  
that repeats  
a digit or  
group of  
digits  
forever.

# TERMINATING DECIMALS

**1.3**

decimals  
that end.

# NON-TERMINATING DECIMALS



3.141592653589793238462643383  
279592884197169399375105820974944  
59230781640628620899862803482534211  
70979821480865132823066470938446095  
50782211705359408 128481117  
45028410 270193852 1105559844  
622948 954930381 964288109  
75 669933446 126475 8482  
3378678316 527120109  
145648566 9234603186  
1085432664 8213393507  
2602491412 7372458700  
66863155881 74881520920 962829  
25409171536 43678925003600113305  
3054882046052 1384146931941511609  
43305727036575 959195309218611738  
19326117931051 1854807446237962  
7495673518657 527248912279381  
8301484912 9838673862  
44065 66430

decimals  
digits are  
repeated  
forever

# PERFECT SQUARES

$$\begin{aligned}\sqrt{1} &= 1 \text{ since } 1^2 = 1 \\ \sqrt{4} &= 2 \text{ since } 2^2 = 4 \\ \sqrt{9} &= 3 \text{ since } 3^2 = 9 \\ \sqrt{16} &= 4 \text{ since } 4^2 = 16 \\ \sqrt{25} &= 5 \text{ since } 5^2 = 25 \\ \sqrt{36} &= 6 \text{ since } 6^2 = 36 \\ \sqrt{49} &= 7 \text{ since } 7^2 = 49 \\ \sqrt{64} &= 8 \text{ since } 8^2 = 64 \\ \sqrt{81} &= 9 \text{ since } 9^2 = 81 \\ \sqrt{100} &= 10 \text{ since } 10^2 = 100\end{aligned}$$

a number  
that is the  
square of an  
integer

# NON-PERFECT SQUARES

A rational number whose square root is not a whole number.

EXAMPLES: 3, 5, 8, 10

PERFECT SQUARE EXAMPLES: 4, 36, 100