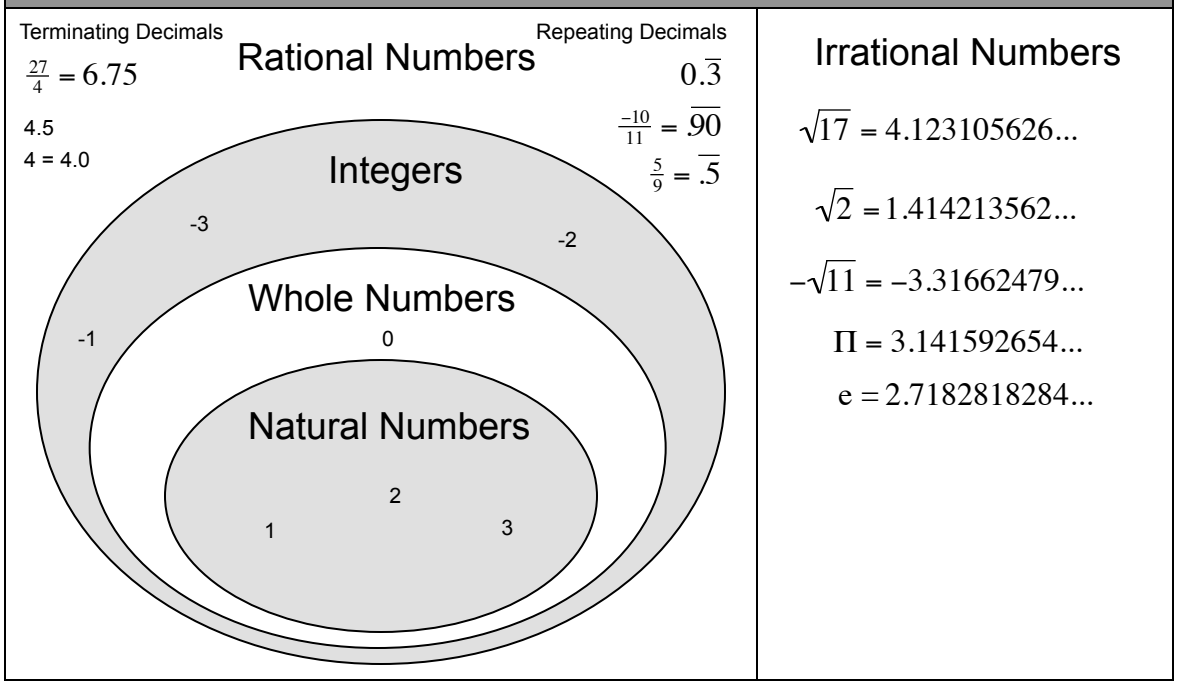
Real Numbers



- Natural numbers are the counting numbers: 1,2,3,…

- Whole Numbers are the natural numbers and zero: 0,1,2,3,…

- Integers are whole numbers and their opposites: …,-3,-2,-1,0,1,2,3…

- Rational numbers can be expressed in the form $\frac{a}{b}$ where *a* and *b* are both integers and $b \neq 0: \frac{1}{2}, \frac{7}{1}, \frac{9}{10}$

- Terminating decimals are rational numbers in decimal form that have a finite number of digits: 1.5, 2.75, 4.0

- Repeating decimals are rational numbers in decimal form that have a block of one or more digits that repeat continuously: $1.\overline{3}, 0.\overline{6}, 2.\overline{14}, 6.2\overline{7}$

- Irrational numbers cannot be expressed in the form $\frac{a}{b}$ They include square roots of whole numbers that are not perfect squares and non-terminating decimals that do not repeat: $\sqrt{2}, \sqrt{11}, \Pi$

EXAMPLES

- ALL NUMBERS ARE PART OF THE REAL NUMBER SYSTEM
- ALL NUMBERS ARE EITHER RATIONAL OR IRRATIONAL
- RATIONAL NUMBERS HAVE EITHER TEMINATING OR REPEATING DECIMALS
- IRRATIONAL NUMBERS CONTINUE TO INFINITY WITHOUT A PATTERN

$\frac{27}{4} = 6.75$ IS A REAL NUMBER AND A RATIONAL # SINCE THE DECIMAL TERMINATES

$\frac{-10}{11} = .\overline{90}$ IS A REAL NUMBER AND A RATIONAL # SINCE THE DECIMAL REPEATS

$\sqrt{17} = 4.123105626...$ IS A REAL NUMBER AND AN IRRATIONAL # SINCE THE DECIMAL PLACES CONTINUE TO INFINITY WTHOUT A PATTERN

-1 = -1.0 IS A REAL NUMBER AND A RATIONAL # SINCE THE DECIMAL TERMINATES
IT IS ALSO AN INTEGER SINCE IT IS THE OPPOSITE OF 1

0 = 0.0 IS A REAL NUMBER AND A RATIONAL # SINCE THE DECIMAL TERMINATES
IT IS ALSO AN INTEGER SINCE IT CAN BE PLACED ON A NUMBER LINE
IT IS ALSO A WHOLE #

1 = 1.0 IS A REAL NUMBER AND A RATIONAL # SINCE THE DECIMAL TERMINATES
IT IS ALSO AN INTEGER SINCE IT CAN BE PLACED ON A NUMBER LINE
IT IS ALSO A WHOLE #
IT IS ALSO A NATURAL #