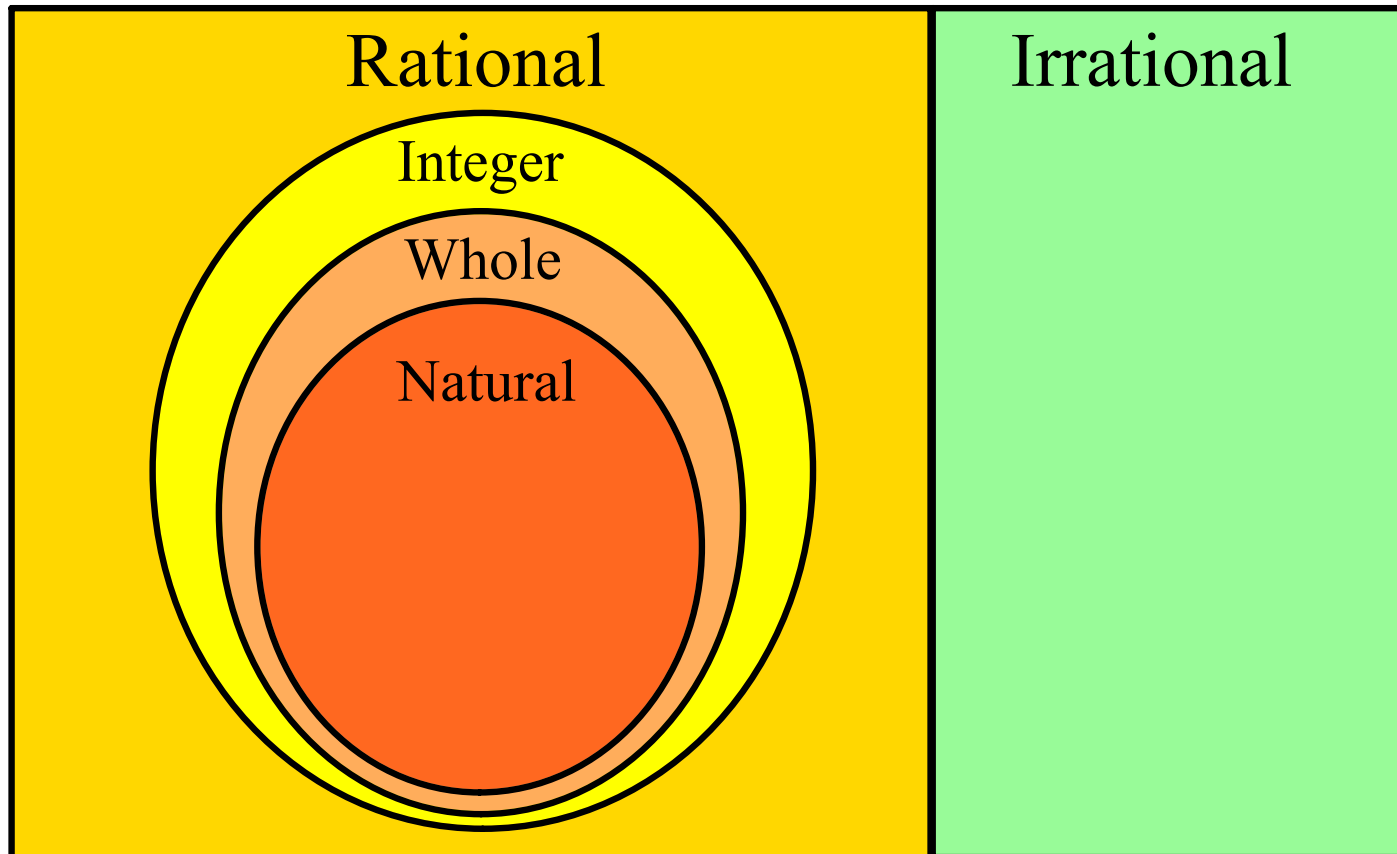


2.1- Operations with Numbers

Real Numbers



Number Sets

Natural Numbers	1, 2, 3, . . .
Whole Numbers	0, 1, 2, 3, . . .
Integers	. . . , -3, -2, -1, 0, 1, 2, 3, . . .
Rational Numbers	$\frac{p}{q}$, where p and q are integers and $q \neq 0$
Irrational Numbers	numbers whose decimal part does not terminate or repeat
Real Numbers	all rational and all irrational numbers

Properties of Addition and Multiplication

For all real numbers a , b , and c :

	Addition	Multiplication
Closure	$a + b$ is a real number	ab is a real number
Commutative	$a + b = b + a$	$ab = ba$
Associative	$(a + b) + c = a + (b + c)$	$(ab)c = a(bc)$
Identity	There is a number 0 such that $a + 0 = a$ and $0 + a = a$.	There is a number 1 such that $1 \cdot a = a$ and $a \cdot 1 = a$.
Inverse	For every real number a there is a real number $-a$ such that $a + (-a) = 0$	For every nonzero real number a there is a real number $\frac{1}{a}$ such that $a \left(\frac{1}{a} \right) = 1$

The Distributive Property

For all real numbers a , b , and c :

$$a(b + c) = ab + ac \text{ and } (b + c)a = ba + ca$$

PEMDAS

Order of Operations

1. Perform operations within the innermost grouping symbols according to Steps 2-4 below.
2. Perform operations indicated by exponents.
3. Perform multiplication and division in order from left to right.
4. Perform addition and subtraction in order from left to right.

Classify each number in as many ways as possible

-1.38

Rational
Real

215

Natural
Whole
Integer
Rational
Real

$\frac{2}{3}$

Rational
Real

π

Irrational
Real

Write and justify each step in the simplification of $(a + b)(c - d)$

$$a(c - d) + b(c - d)$$

Dist. prop

$$ac - ad + bc - bd$$

Dist. prop.

If the sales tax is 6%, then $T = c + 0.06c$. Show that $T = 1.06c$. Justify your answer.

$$T = c + 0.06c$$

$$T = 1c + 0.06c$$

Ident. prop. of mult.

$$T = c(1 + 0.06)$$

Dist. prop.

$$T = 1.06c$$

Add

Evaluate $\frac{18 - 2 \cdot 5}{15 + 3(-3)}$

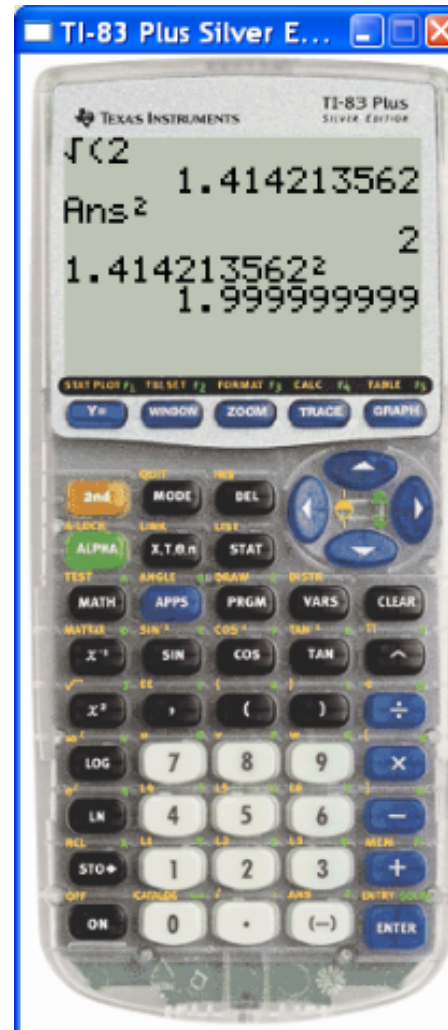
$$\frac{18 - 10}{15 + (-9)} = \frac{8}{6} = \left(\frac{4}{3}\right)$$

Homework

Pg. 90-92 #27-31, 38-54 even, 67-70,
#74, 75

$$74) (\sqrt{2})^2 = (1.4142)^2$$

$$2 \neq 1.99$$



$$75) \quad {}_{12} \left[\frac{.5 P}{12} = 224 \right]$$

$$2 \left[.5 P = 2688 \right]$$

$$P = \$5376$$