

1.2: Properties of Real Numbers

Real numbers are classified in a variety of ways.

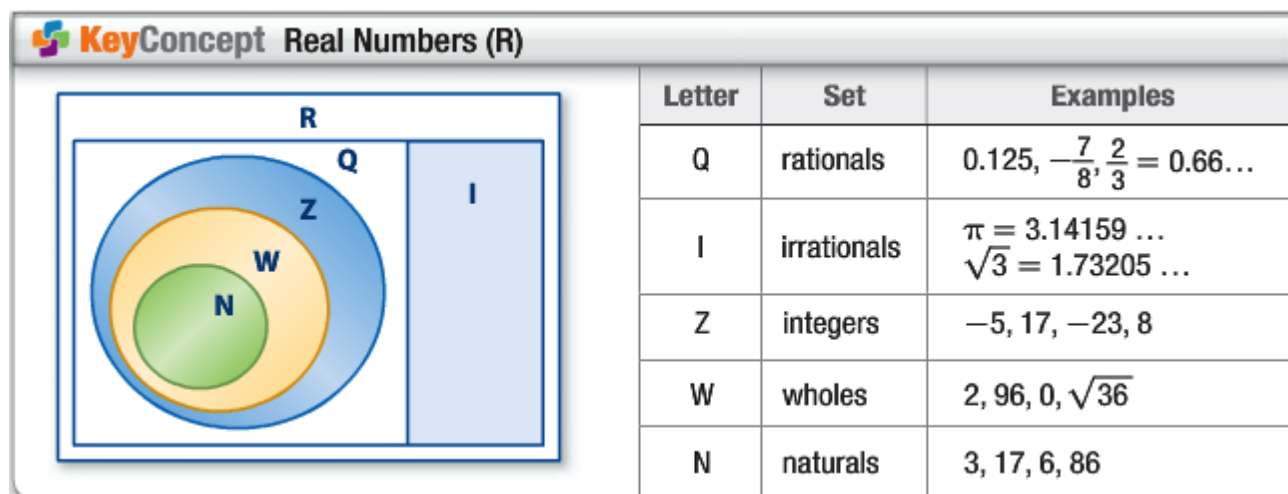
Natural numbers: 1, 2, 3, ...

Whole numbers: all Natural numbers, and 0. So, 0, 1, 2, 3, ...

Integers: all Whole numbers, and the negative countable numbers: ... , -3, -2, -1, 0, 1, 2, 3, ...

Rational numbers: all Integers, and *ratios* of integers, so fractions, ending decimals, and repeating decimals

Irrational numbers: cannot be represented by a ratio of integers. They're decimals that continue on without a pattern. Common examples include $\sqrt{}$ and π .



Ex#1: Name all of the sets of numbers to which each number belongs.

a) -185

b) $\sqrt{49}$

c) $\sqrt{95}$

d) $-\frac{7}{8}$

e) 0

f) $0.5\bar{8}$

Real Number Properties (and Examples)

For any real numbers, a , b , and c		
Property	Addition	Multiplication
Commutative	$a + b = b + a$	$a \cdot b = b \cdot a$
Associative	$(a + b) + c = a + (b + c)$	$(a \cdot b) \cdot c = a \cdot (b \cdot c)$
Identity	$a + 0 = a$	$a \cdot 1 = a$
Inverse	$a + (-a) = 0$	$a \cdot \frac{1}{a}$
Distributive	$\underline{a}(b + c) = \underline{a}b + \underline{a}c$	

Ex:#2: Please name the property illustrated by each of the following.

a) $(6 \cdot 8) \cdot 5 = 6 \cdot (8 \cdot 5)$

b) $84 + 16 = 16 + 84$

c) $(12 + 5)6 = 12 \cdot 6 + 5 \cdot 6$

Ex#3: Please find the additive and multiplicative inverses of each of the following numbers.

a) -7

b) 0.8 (hint: turn into a fraction)

Ex#4: Please simplify the following expressions.

a) $-2a + 4a(8 - 3a)$

b) $3(4x - 2y) - 2(3x + y)$