



Natural Numbers

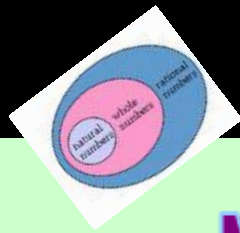
Whole Numbers

Integers

Rational

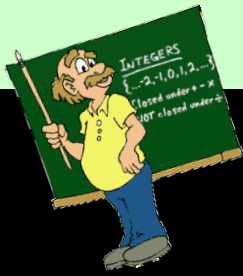
Irrational

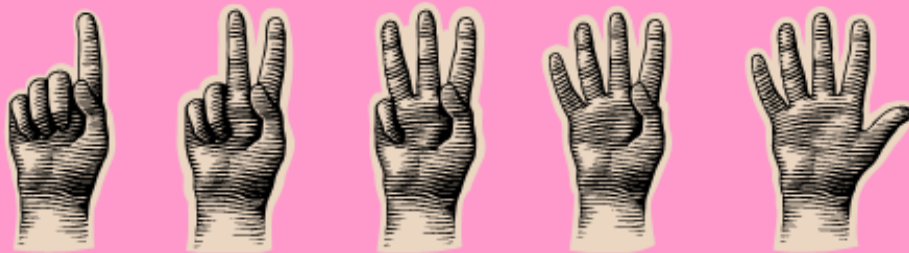
Real



0

Natural Numbers, Whole Numbers and Integers





Natural Numbers

Natural numbers are the numbers we use everyday for counting.

$N \{ 1, 2, 3, 4, 5, \dots \}$



Whole Numbers

The set of whole numbers includes zero,
as well as all the natural numbers

W {0, 1, 2, 3, 4, 5, ...}



Integers

Integers are whole numbers
and their opposites.

$\{ -3, -2, -1, 0, 1, 2, \dots \}$

*Be
Rational!* *Get
Real!*

i π

Rational or Irrational ??





Irrational Numbers

Irrational Numbers can not be written as a fraction m/n , where $n \neq 0$. It is represented by a decimal that does not terminate or repeat.

Examples : $\sqrt{26} = 5.099019514\dots\dots$
 $\sqrt[4]{15} = 1.967989671\dots\dots$
 $\sqrt[3]{10} = 2.15443469\dots\dots$

They go
on forever
with no
pattern!!



Rational Numbers



Any number that **can** be written in the form m/n , where $n \neq 0$.
Rational numbers **terminate** or **repeat**.

$$4/5 = 0.8$$

$$1/3 = 0.3333\dots \\ = 0.\overline{3}$$

$$\sqrt{25} = 5$$

Rational
Numbers

$$\sqrt[3]{27}$$

$$\sqrt{100}$$

$$\sqrt{\frac{9}{64}}$$

$$0.5$$

$$0.8^2$$

$$\sqrt{25}$$

Irrational
Numbers

$$\sqrt{0.24}$$

$$\sqrt[3]{9}$$

$$\frac{\sqrt{18}}{3}$$

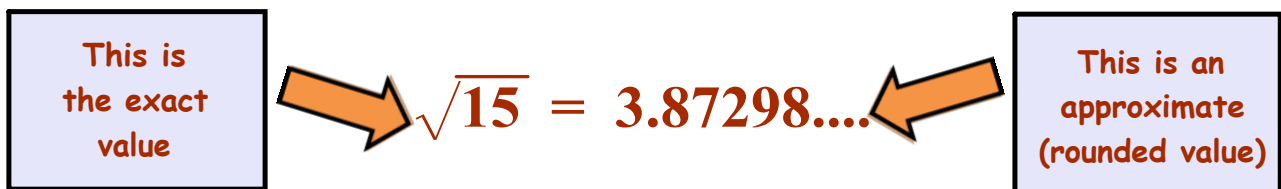
$$\sqrt[4]{12}$$

$$\sqrt{1/3}$$

$$\sqrt{64}$$

Irrational Radicals

When an irrational number is written as a **radical**, the radical is the **exact value** of the **irrational number**.



Rational Radicals

Radicals that are square roots of perfect squares, cube roots of perfect cubes, and so on are rational numbers.

$$\sqrt[3]{8} = 2 \quad \sqrt[4]{256} \quad \sqrt{16/25}$$

Let's Check Your Understanding!

Tell whether each number is rational or irrational.

a) $\sqrt{49/16}$
Rat.
 $= 7/4$

b) $\sqrt[3]{-30}$
Irr.

c) 1.21
Rat.

d) $-3/5$
Rat.

e) $\sqrt[3]{8/27}$
 $\frac{2}{3}$ *Rat.*