

## 4.2 Irrational Numbers

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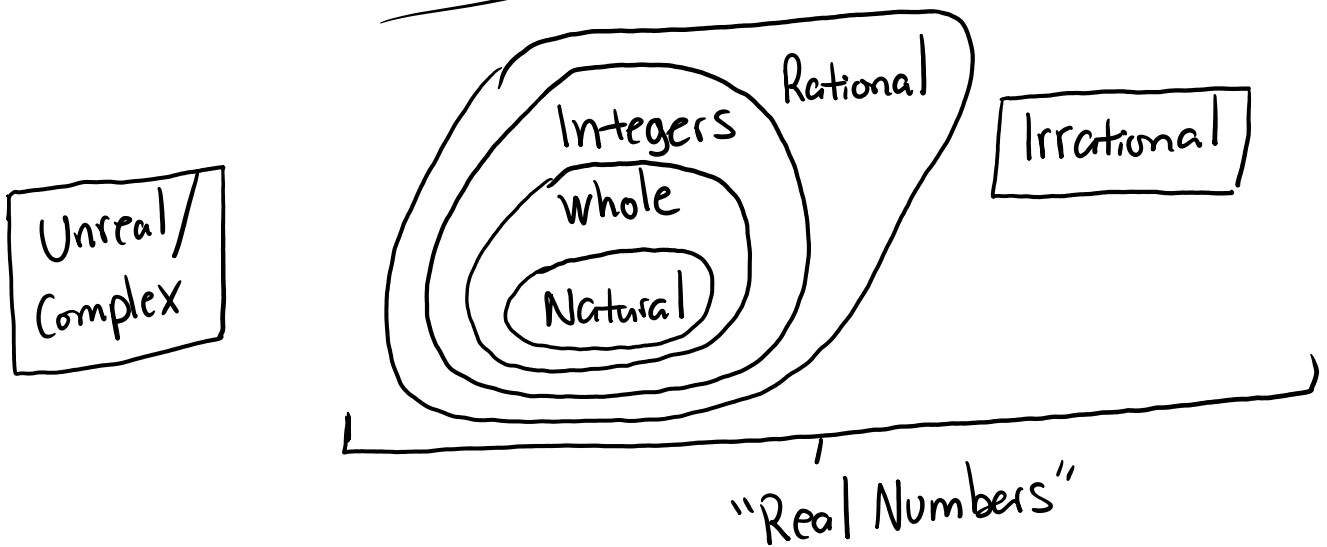
Rational numbers can be written as either:

or "m" (ie. 5, -3, 6.2, etc...)  
 or "m/n" (ie.  $\frac{3}{2}$ ,  $-\frac{7}{3}$ , etc...)

While irrational numbers cannot be written as  $\frac{m}{n}$   
 (where n and m are integers and  $n \neq 0$ )

★ Irrational numbers in decimal form, never terminate (end)  
AND they also don't repeat with a pattern. ★

The number systems:



Natural:  $\mathbb{N}$  : 1, 2, 3, ...  
 Whole:  $\mathbb{W}$  : 0, 1, 2, ...  
 Integers:  $\mathbb{Z}$  : ..., -2, -1, 0, 1, 2, ...  
 Rational:  $\mathbb{Q}$  :  $\frac{5}{2}$ ,  $\frac{1}{2}$ ,  $\frac{3}{3}$ , ex.

Real:  
 $\mathbb{R}$

Complex:  $\mathbb{C}$   
 $i = \sqrt{-1}$

... Irrational?

terminates.

numbers

Ex: Rational or Irrational?

a)  $-\frac{3}{5} \Rightarrow$  Rational

$\therefore -\frac{3}{5} = -0.6$

Terminates,  
 $\therefore$  it's rational.

b)  $\sqrt{14} \Rightarrow$  Irrational

14 is not a perfect square.

c)  $\frac{1}{3} \Rightarrow$  Rational

Although  $\frac{1}{3}$  doesn't terminate, it repeats with a pattern.

"m/n"

Ex: Order the following from least to greatest:

$\sqrt[3]{13}$ ,  $\sqrt{18}$ ,  $\sqrt{9}$ ,  $\sqrt[4]{27}$ ,  $\sqrt[3]{-5}$

calculator:

$\approx 2.35133...$

$\approx 4.24...$

$= 3$

$\approx 2.28$

$\approx -1.71$

$\Rightarrow \sqrt[3]{-5}, \sqrt[3]{13}, \sqrt[4]{27}, \sqrt{9}, \sqrt{18}$

HW: Pg. 211 # 3, 4, 10/11, 14, 15, 18, 19

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