

Sets of Numbers

Natural Numbers = $\mathbb{N} = \{ 1, 2, 3, \dots \}$ roster notation

$A = \{ 1, 2, 3, 4, 5 \} = \{ x \in \mathbb{N} \mid x \leq 5 \}$ set-builder notation

Whole Numbers = $\mathbb{W} = \{ 0, 1, 2, 3, \dots \}$

\mathbb{N} is a subset of \mathbb{W} $\mathbb{N} \subseteq \mathbb{W}$

The Empty set = $\emptyset = \{ \}$ (Null set)

Integers = $\mathbb{Z} = \{ \dots, -3, -2, -1, 0, 1, 2, 3, \dots \}$

$\mathbb{N} \subseteq \mathbb{W} \subseteq \mathbb{Z}$

Rationals = $\mathbb{Q} = \{ x \mid x = \frac{a}{b} \quad a, b \in \mathbb{Z} \text{ and } b \neq 0 \}$

$\frac{1}{2} \in \mathbb{Q}$ $\frac{4}{5} \in \mathbb{Q}$ $4 = \frac{4}{1} \in \mathbb{Q}$

$\mathbb{N} \subseteq \mathbb{W} \subseteq \mathbb{Z} \subseteq \mathbb{Q}$

$\frac{1}{2} = 0.5$ $\frac{4}{5} = 0.8$ decimals that end

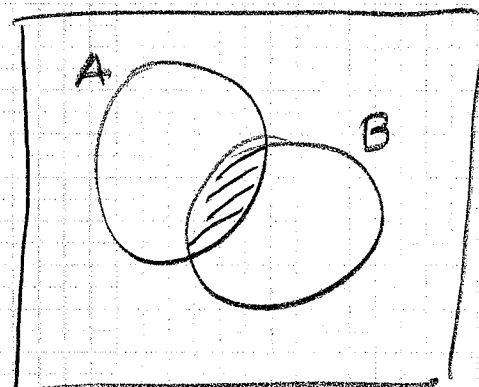
$\frac{1}{3} = 0.333\dots$ $\frac{25}{99} = 0.252525\dots$ pattern of repetition

Irrationals = \mathbb{I} is the set of decimals that do not terminate and don't have a pattern of repetition

EX: $\sqrt{2} = 1.414213562\dots$

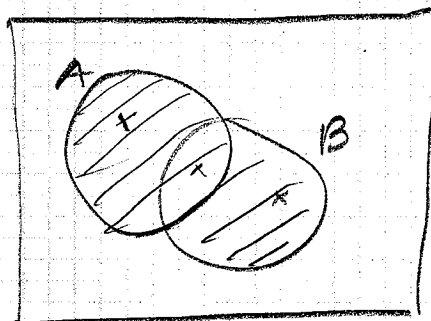
$\pi = 3.141592654\dots$

A Intersection B = $A \cap B =$
 $= \{ x \mid x \in A \text{ and } x \in B \}$



Venn Diagram

A Union B = $A \cup B =$
 $= \{ x \mid x \in A \text{ or } x \in B \}$



Reals = $\mathbb{Q} \cup \mathbb{I}$

