

SET THEORY.

WHAT KIND OF NUMBER IS $0.\overline{3}$

SAME OR DIFFERENT THAN

$\sqrt{2}$ or 1.5 or -4 or 3

THERE ARE DIFFERENT TYPES
OF NUMBERS.

\mathbb{N} NATURAL (OR COUNTING) NUMBERS.

$1, 2, 3, 4, 5, \dots$

\mathbb{N} includes 0

\mathbb{N}^* does not include 0

\mathbb{Z} INTEGERS

POSITIVE AND NEGATIVE 'WHOLE' NUMBERS.

$$\mathbb{Z} \cdot \{ \bullet -4, -3, -2, -1, 0, 1, 2, 3, \dots \}$$

\mathbb{Q} RATIONALS.

RATIONAL MEANS FRACTION.

ANY NUMBER THAT CAN BE REPRESENTED AS A FRACTION (OF INTEGERS) BELONGS TO THE RATIONAL NUMBER SET \mathbb{Q} IN DECIMAL FORM, THIS INCLUDES

- TERMINATING DECIMALS EX: $(-0.5, 3.25)$
- REPEATING DECIMALS EX: $(0.\overline{1}, 1.\overline{3})$

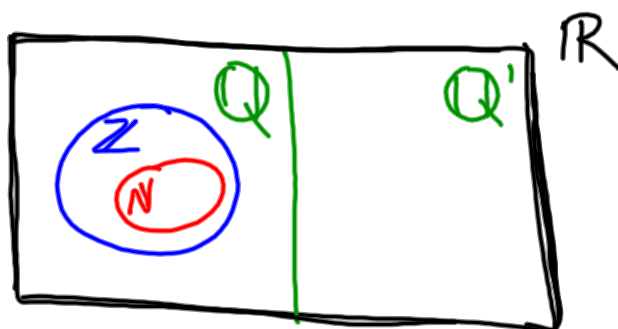
IRRATIONALS \mathbb{Q}'

↳ THESE ARE NUMBERS THAT CAN NOT BE EXPRESSED AS A FRACTION.

THEY ARE NON-REPEATING AND NON-TERMINATING.

Ex: $\sqrt{2}, \sqrt{3}, \sqrt{5}, \pi, \dots$

REAL NUMBERS \rightarrow ALL THE \mathbb{Q} AND \mathbb{Q}'
 \mathbb{R} YOU'VE EVER USED.



PROVE THAT 8.5 IS A RATIONAL NUMBER.

$$8.5 \cdot \frac{10}{10} = \frac{85}{10} \stackrel{\div 5}{=} \frac{17}{2}$$

8.5 CAN BE EXPRESSED AS $\frac{17}{2}$

SHOW THAT $0.\overline{6}$ IS A RATIONAL NUMBER.

$$0.\overline{6} = x$$

$$6.\overline{6} = 10x$$

$$\begin{array}{r} 10x = 6.\overline{6} \\ - 1x = 0.\overline{6} \\ \hline \end{array}$$

$$\frac{9x}{9} = \frac{6}{9}$$

$$x = \frac{6}{9} \stackrel{\div 3}{=} \frac{2}{3}$$

$0.\overline{6}$ CAN BE EXPRESSED AS

$$\frac{2}{3}$$