August 25, 2017

* Add/Drop
* SLC #1 - Due Monday
* Quiz #1 - Wednesday
  - CORE 10
  - Reading
  - Practice Set

Aug 25-9:54 AM

$\mathbb{N} = \{1, 2, 3, \ldots\}$

$\mathbb{W} = \{0, 1, 2, 3, \ldots\}$

$\mathbb{Z} = \{\ldots, -2, -1, 0, 1, 2, \ldots\}$

$\mathbb{Q} = \left\{ \frac{m}{n} \mid m, n \in \mathbb{Z} \text{ & } n \neq 0 \right\}$

$\mathbb{Q}' = \{\text{not } \mathbb{Q}\}$

Aug 25-10:04 AM

$\mathbb{Q}$ $\frac{3}{4}$, $\frac{13}{5}$, $\frac{6}{1}$

| | $\mathbb{N}$ | $\mathbb{W}$ | $\mathbb{Z}$ | $\mathbb{Q}$ |
|---|---|---|---|---|
| 6 | ✓ | ✓ | ✓ | ✓ |
| -6 | | | ✓ | ✓ |

Fractions (Rational Numbers)

$\frac{3}{4}$ ; 3 : 4, $4\overline{)3.000}$ $= 0.75$

$-28$

$20$

$-20$

$0$ ← Remainder

$\frac{1}{6}$ ; 1 : 6; $6\overline{)1.000}$ $= 0.1\overline{6}$

$-6$

$40$

$-36$

$40$

$-36$

$4$

Aug 25-10:06 AM

Convert Decimals to fractions

① $0.62 = \frac{62}{100} = \frac{2 \cdot 31}{2 \cdot 2 \cdot 5 \cdot 5} = \frac{31}{50}$

(2 "1"s)

Aug 25-10:15 AM

② $0.\overline{27} = 0.27272727\ldots$

Steps

a.) Let $x = 0.27272727\ldots$

b.) multiply by a power of 10 to make a whole number.

$100 \cdot x = 0.27272727\ldots (100)$

$100x = 27.27272727\ldots$

c.) Subtract a) from b.)

b.) $100x = 27.27272727\ldots$

a.) $\underline{\quad 0x = 0.27272727\ldots}$

$99x = 27$

$\frac{99x}{99} = \frac{27}{99}$

$x = \frac{27}{99} = \frac{3 \cdot 3 \cdot 3}{3 \cdot 3 \cdot 11}$ ("1" "1")

$= \frac{3}{11}$

Aug 25-10:18 AM

Show that $\sqrt{2}$ is not Rational

Suppose $\sqrt{2}$ is Rational (Proof by Contradiction)

Let $p$ & $q \in \mathbb{Z}$

$\left(\sqrt{2}\right)^2 = \left(\frac{p}{q}\right)^2$

$q^2 \left(2 = \frac{p^2}{q^2}\right)$

$q^2 \cdot 2 = p^2$

$q \cdot q \cdot 2 \neq p \cdot p$

i.e. a contradiction!

Thus, $\sqrt{2}$ is irrational ∎

Aug 25-10:40 AM

$\mathbb{R} = \{ x \mid x \text{ is a Real Number} \}$

Aug 25-10:49 AM

Convert $0.\overline{54} = \frac{6}{11}$

Aug 25-10:26 AM

$\mathbb{Q}'$ ← not the thing (Prime)

$\mathbb{Q}' = \{$ All numbers not in $\mathbb{Q}\}$

$\mathbb{Q}'$ Prime

↓

Irrational Numbers

$\pi, e, \sqrt{2}, \sqrt{3}, \sqrt[3]{2}$

Aug 25-10:36 AM