January 12, 2015

* Quiz #1 – Friday

Jan 12-9:54 AM

Sets

① $\mathbb{N} = \{1, 2, 3, \ldots\}$

② $\mathbb{W} = \{0, 1, 2, \ldots\}$

③ $\mathbb{Z} = \{\ldots, -1, 0, 1, \ldots\}$

④ $\mathbb{Q} = \left\{ \frac{m}{n} \mid m \text{ \& } n \text{ are integers \& } n \neq 0 \right\}$

⑤ $\overline{\mathbb{Q}}$ (prime (opposite of) $\mathbb{Q}$) $= \{$all numbers that are not rational$\}$

⑥ $\mathbb{R}$ (Real) $= \{ x \mid x \text{ is } \mathbb{Q} \text{ or } \overline{\mathbb{Q}} \}$ (such that)

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-16 is in: $\mathbb{Z}$, $\mathbb{Q}$, $\mathbb{R}$

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$\frac{5}{8} = 8\overline{)5.000}$

0.625

-48

20

-16

40

-40

0

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$\frac{5}{11} = 11\overline{)5.00}$

$.454$

-44

60

-55

50

-44

6

$= 0.4\overline{54}$

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$0.4\overline{54}$

① Let $x = 0.4\overline{54}$

② $100x = 100(0.4\overline{54})$

$100x = 45.\overline{454}$

③ $-\ x = 0.4\overline{54}$

$\frac{99x}{99} = \frac{45}{99}$

$x = \frac{45}{99} = \frac{5}{11}$

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#21) $0.\overline{84}$

Let $x = 0.\overline{84}$

$100x = 84.\overline{84}$

$x = 0.\overline{84}$

$99x = 84$

$x = \frac{84}{99} = \frac{28}{33}$

*always Reduce!

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0.760 (10th, 100th, 1000th)

$= \frac{760}{1000} = \frac{76}{100} = \frac{38}{50} = \frac{19}{25}$

$\frac{76}{100} = \frac{2 \cdot 2 \cdot 19}{2 \cdot 2 \cdot 5 \cdot 5} = 1 \cdot 1 \cdot \frac{19}{25} = \frac{19}{25}$

$76 = 2 \cdot 2 \cdot 19$

$2 \cdot 38$

$2 \cdot 19$

$100 = 2 \cdot 2 \cdot 5 \cdot 5$

$2 \cdot 50$

$2 \cdot 25$

$5 \cdot 5$

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$\mathbb{Q}' = \{$all numbers not Rational$\}$

$\sqrt{3} \neq \mathbb{Q}$

Proof by Contradiction

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Prove that $\sqrt{3}$ is irrational.

① assume that $\sqrt{3}$ is Rational.

② If $\sqrt{3}$ is Rational, then

$(\sqrt{3})^2 = (\frac{m}{n})^2$ Square both sides

$3 = \frac{m^2}{n^2}$ Clear equation of fraction

$n^2 \left[3 = \frac{m^2}{n^2}\right]$

* $3n^2 = m^2$

$3 \cdot n \cdot n = m \cdot m$

3 thing 2 thing

$3 \neq 2$

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