

6pts

1. If possible list the elements of each set or give a definition of the elements of set.
(Do NOT just give a few examples of the elements.)

a. Integers = $\{ \dots, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, \dots \}$ = All whole numbers and their negatives.

b. Rational numbers = $\{ \frac{a}{b} \mid a, b \in \text{Integers}, b \neq 0 \}$

= the ratio of two integers, with the denominator not zero

= terminating decimals or infinite, repeating decimals

c. Irrational numbers = numbers that cannot be written as the ratio of two integers

= infinite, non-repeating decimals

3pts

2. Considering the three sets above, which of these sets of numbers are closed for division? (excluding division by zero) Rational numbers

Explain: Rational numbers are fractions that are the ratio of integers.

When you divide two rational numbers the answer is always another rational number.

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{a \cdot d}{b \cdot c}$$

But when you divide two integers you may get an answer that is not an integer.

For example: $2 \div 3 = \frac{2}{3}$

But when you divide two irrational numbers you may get an answer that is not an irrational #.

For example: $\sqrt{3} \div \sqrt{3} = 1$, which is a rational number, not an irrational number.

2pts

3. a. List a rational number between 2.63636363... and 2.64646464...

There are an infinite number of possible answers; any terminating or infinite repeating decimal that is between the given numbers.

b. List an irrational number between 2.63636363... and 2.64646464...

There are an infinite number of possible answers; any infinite non-repeating decimal number that is between the given numbers.

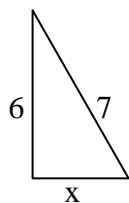
2pts

4. Use rules of exponents to simplify $(8)^{\frac{4}{3}}$. Show your steps to illustrate the rules you used.

$$8^{\frac{4}{3}} = (\sqrt[3]{8})^4 = (\sqrt[3]{2^3})^4 = 2^4 = 16 \quad \text{or} \quad 8^{\frac{4}{3}} = (2^3)^{\frac{4}{3}} = 2^{2 \cdot \frac{4}{3}} = 2^4 = 16$$

2pts

5. Find the missing side in this right triangle. Show your work.



$$\begin{aligned} 6^2 + x^2 &= 7^2 \\ x^2 &= 49 - 36 = 13 \\ x &= \sqrt{13} \end{aligned}$$