



Properties of Rational Numbers

1) *Closure property of addition:* The sum of any two rational numbers is always a _____.

2) Which of the following demonstrates the closure property of addition for any two rational numbers $\frac{a}{b}$ and $\frac{c}{d}$?

a) $\frac{a}{b} + \frac{c}{d}$ is an integer

b) $\frac{a}{b} + \frac{c}{d}$ is a rational number

c) $\frac{a}{b} + \frac{c}{d}$ is a whole number

d) both a and c

3) If $a = \frac{1}{4}$, $b = \frac{1}{6}$, then show that the sum of a and b follows the closure property of addition?

$$\text{Step 1} - \left(\frac{1}{4} + \frac{1}{6} \right) = \left(\frac{4}{4} - \frac{6}{6} \right)$$

$$\text{Step 2} - \left(\frac{1}{4} + \frac{1}{6} \right) = \text{_____}$$

$$\text{Step 3} - \text{Simplest form of } \frac{10}{24} = \text{_____}$$

Step 4 - Thus, the sum of two rational numbers $\left(\frac{1}{4} + \frac{1}{6} \right) = \frac{5}{12}$ is also a _____.



4) **Closure property of subtraction:** The difference of any two rational numbers is always a _____.

5) Which of the following demonstrates the closure property of subtraction for any two rational numbers $\frac{a}{b}$ and $\frac{c}{d}$?

- a) $\frac{a}{b} - \frac{c}{d}$ is a whole number
- b) $\frac{a}{b} - \frac{c}{d}$ is an integer
- c) $\frac{a}{b} - \frac{c}{d}$ is a rational number
- d) both a and c

6) If $a = \frac{1}{3}$, $b = \frac{1}{2}$, then show that the difference of a and b follows the closure property of subtraction?

$$\text{Step 1} - \left(\frac{1}{3} - \frac{1}{2} \right) = \left(\frac{2}{3} - \frac{3}{2} \right)$$

$$\text{Step 2} - \left(\frac{1}{3} - \frac{1}{2} \right) = \text{_____}$$

Step 3 - Thus, the difference of two rational numbers $\left(\frac{1}{3} - \frac{1}{2} \right) =$ is also a _____.

7) Addition and subtraction follow closure property: a) yes b) no