



Properties of Rational Numbers

1) **Associative property:** While adding, any three rational numbers can be _____ in any order, and yet their _____ remains the same.

2) Which of the following demonstrates the associative property of **addition** for any three rational numbers $\frac{a}{b}$, $\frac{c}{d}$ and $\frac{e}{f}$?

a) $\frac{a}{b} + \left(\frac{c}{d} + \frac{e}{f}\right) = \frac{c}{d} - \left(\frac{a}{b} + \frac{e}{f}\right)$

b) $\frac{a}{b} + \left(\frac{c}{d} + \frac{e}{f}\right) = \left(\frac{a}{b} + \frac{c}{d}\right) + \frac{e}{f}$

c) $\frac{a}{b} + \left(\frac{c}{d} - \frac{e}{f}\right) = \frac{c}{d} + \left(\frac{a}{b} - \frac{e}{f}\right)$

d) $\frac{a}{b} + \frac{c}{d} = \frac{e}{f} + \frac{a}{b}$

3) If $a = \frac{-3}{4}$, $b = \frac{5}{8}$ and $c = \frac{1}{6}$, then which of the following is **true** for the associative property of **addition**?

a) $\frac{5}{8} + \left(\frac{-3}{4} + \frac{1}{6}\right) = \left(\frac{-3}{4} + \frac{5}{8}\right) - \frac{1}{6}$

b) $\left(\frac{5}{8} + \frac{1}{6}\right) - \left(\frac{3}{4}\right) = \left(\frac{3}{4} - \frac{5}{8}\right) + \frac{1}{6}$

c) $\frac{5}{8} + \frac{1}{6} = \frac{5}{8} - \frac{3}{4}$

d) $\frac{-3}{4} + \left(\frac{5}{8} + \frac{1}{6}\right) = \left(\frac{-3}{4} + \frac{5}{8}\right) + \frac{1}{6}$



4) Which of the following operations is **not** associative for rational numbers?

a) Addition and subtraction

b) Addition and multiplication

c) Multiplication and division

d) Subtraction and division

5) The **additive inverse** $\frac{a}{b}$ for every rational number is $\frac{-a}{b}$. Thus,

$$\frac{a}{b} + \left(\frac{-a}{b}\right) = \text{-----}$$

6) The **additive inverse** of $\frac{1}{7} = \text{-----}$ a) 0 b) $\frac{-1}{7}$ c) 1 d) 7

7) $\frac{4}{9} + \left(\frac{-4}{9}\right) = \text{-----}$ a) 1 b) $\frac{-4}{9}$ c) 0 d) $\frac{4}{9}$

8) Verify: $\frac{1}{3}, \frac{2}{7}$ and $\frac{3}{7}$ follows the associative property of **addition**

$\frac{1}{3} + \left(\frac{2}{7} + \frac{3}{7}\right) = \frac{1}{3} + \frac{(2+3)}{7}$	$\left(\frac{1}{3} + \frac{2}{7}\right) + \frac{3}{7} = \frac{7(1)+3(2)}{3 \times 7} + \frac{3}{7}$
$= \frac{7(1)+3(5)}{3 \times 7}$	$= \frac{7}{3 \times 7} \frac{6}{7} + \frac{3}{7} = \frac{13}{21} + \frac{3}{7}$
$= \text{-----} = \text{-----}$	$= \frac{13}{21} \frac{3(3)}{7} = \text{-----}$
Sum = -----	Sum = -----
Associative property of addition is verified = -----	