



## 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**

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