



Properties of Rational Numbers

- 1) **Associative property:** While multiplying, 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 **multiplication** for any three rational numbers $\frac{a}{b}$, $\frac{c}{d}$ and $\frac{e}{f}$?
- a) $\frac{a}{b} \times \left(\frac{c}{d} \times \frac{e}{f} \right) = \frac{c}{d} \div \left(\frac{a}{b} \div \frac{e}{f} \right)$
- b) $\frac{a}{b} \div \left(\frac{c}{d} \times \frac{e}{f} \right) = \left(\frac{a}{b} \div \frac{c}{d} \right) \times \frac{e}{f}$
- c) $\frac{a}{b} \times \left(\frac{c}{d} \times \frac{e}{f} \right) = \left(\frac{a}{b} \times \frac{c}{d} \right) \times \frac{e}{f}$
- d) $\frac{a}{b} \times \frac{c}{d} = \frac{e}{f} \div \frac{a}{b}$
- 3) Which expression demonstrates the associative property of multiplication for rational numbers $\frac{-2}{3}$, $\frac{5}{9}$ and $\frac{8}{11}$?
- a) $\left(\frac{-2}{3} \times \frac{5}{9} \right) \times \frac{8}{11} = \frac{5}{9} \div \left(\frac{-2}{3} \div \frac{8}{11} \right)$
- b) $\left(\frac{-2}{3} \times \frac{5}{9} \right) \times \frac{8}{11} = \left(\frac{-2}{3} \right) \times \left(\frac{5}{9} \times \frac{8}{11} \right)$
- c) $\left(\frac{-2}{3} \div \frac{5}{9} \right) \times \frac{8}{11} = \frac{5}{9} \times \left(\frac{-2}{3} \div \frac{8}{11} \right)$
- d) $\frac{-2}{3} \times \frac{5}{9} = \frac{5}{9} \times \frac{8}{11}$



4) Verify: $\frac{1}{3}, \frac{2}{7}, \frac{4}{5}$ follows the associative property of **multiplication**

$\frac{1}{3} \times \left(\frac{2}{7} \times \frac{4}{5} \right) = \frac{1}{3} \times \frac{(2 \times 4)}{(7 \times 5)}$ $= \frac{1}{3} \times \frac{8}{35} = \text{-----}$	$\left(\frac{1}{3} \times \frac{2}{7} \right) \times \frac{4}{5} = \frac{(1 \times 2)}{(3 \times 7)} \times \frac{4}{5}$ $= \frac{2}{21} \times \frac{4}{5} = \text{-----}$
Product = -----	Product = -----
associative property of multiplication is verified -----	

5) For every non-zero rational number $\frac{a}{b}$ has its **multiplicative**

inverse $\frac{b}{a}$. Thus, $\frac{a}{b} \times \frac{b}{a} = \frac{b}{a} \times \frac{a}{b} = \text{-----}$.

6) The multiplicative inverse is also known as **reciprocal** of a number.

Thus, the **reciprocal** of $\frac{a}{b}$ is a) 1 b) $\frac{-a}{b}$ c) 0 d) $\frac{b}{a}$

7) Zero has **no** reciprocal a) yes b) no

8) Match the following **multiplicative inverse** for rational number

a) 0	$\frac{11}{19}$
b) $\frac{-4}{7}$	$\frac{1}{0}$ (unknown)
c) $\frac{19}{11}$	$\frac{-7}{4}$