Codingal

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) $\frac{-2}{3} \times \frac{5}{9} = \frac{5}{9} \times \frac{8}{11}$

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

$\frac{1}{3} \times \left(\frac{2}{7} \times \frac{4}{5}\right) = \frac{1}{3} \times \frac{(2 \times 4)}{(7 \times 5)}$ $= \frac{1}{3} \times \frac{8}{35}$ = ----------	$\left(\frac{1}{3} \times \frac{2}{7}\right) \times \frac{4}{5} = \frac{(1 \times 2)}{(3 \times 7)} \times \frac{4}{5}$ $= \frac{2}{21} \times \frac{4}{5}$ = ----------
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, $\frac{a}{b} \times \frac{b}{a} = \frac{b}{a} \times \frac{a}{b}$ = _____ .

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) $\frac{19}{11}$	$\frac{-7}{4}$

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