

CBSE Class –VIII Mathematics
NCERT Solutions
CHAPTER - 1
Rational Numbers (Ex. 1.1)

Questions

1. Using appropriate properties to find:

(i) $-\frac{2}{3} \times \frac{3}{5} + \frac{5}{2} - \frac{3}{5} \times \frac{1}{6}$

(ii) $\frac{2}{5} \times \left(\frac{3}{-7}\right) - \frac{1}{6} \times \frac{3}{2} + \frac{1}{14} \times \frac{2}{5}$

Ans. (i) $-\frac{2}{3} \times \frac{3}{5} + \frac{5}{2} - \frac{3}{5} \times \frac{1}{6}$

$$= -\frac{2}{3} \times \frac{3}{5} - \frac{3}{5} \times \frac{1}{6} + \frac{5}{2} \text{ [Using Associative property]}$$

$$= \frac{3}{5} \left(\frac{-2}{3} - \frac{1}{6} \right) + \frac{5}{2} \text{ [Using distributive property]}$$

$$= \frac{3}{5} \left(\frac{-4-1}{6} \right) + \frac{5}{2}$$

$$= \frac{3}{5} \times \frac{-5}{6} + \frac{5}{2}$$

$$= -\frac{1}{2} + \frac{5}{2}$$

$$= \frac{-1+5}{2} = \frac{4}{2} = 2$$

(ii) $\frac{2}{5} \times \left(\frac{3}{-7}\right) - \frac{1}{6} \times \frac{3}{2} + \frac{1}{14} \times \frac{2}{5}$

$$= \frac{2}{5} \times \left(\frac{-3}{7} \right) + \frac{1}{14} \times \frac{2}{5} - \frac{1}{6} \times \frac{3}{2} \quad [\text{Using Associative property}]$$

$$= \frac{2}{5} \times \left(\frac{-3}{7} + \frac{1}{14} \right) - \frac{1}{4} \quad [\text{Using distributive property}]$$

$$= \frac{2}{5} \times \left(\frac{-6+1}{14} \right) - \frac{1}{4}$$

$$= \frac{2}{5} \times \frac{-5}{14} - \frac{1}{4} = \frac{-1}{7} - \frac{1}{4}$$

$$= \frac{-4-7}{28} = \frac{-11}{28}$$

2. Write the additive inverse of each of the following:

(i) $\frac{2}{8}$ (ii) $\frac{-5}{9}$ (iii) $\frac{-6}{-5}$ (iv) $\frac{2}{-9}$ (v) $\frac{19}{-6}$

Ans. We know that additive inverse of a rational number $\frac{a}{b}$ is $\left(\frac{-a}{b} \right)$, such that

$$\frac{a}{b} + \left(\frac{-a}{b} \right) = 0.$$

(i) Additive inverse of $\frac{2}{8}$ is $\frac{-2}{8}$. (ii) Additive inverse of $\frac{-5}{9}$ is $\frac{5}{9}$.

(iii) Additive inverse of $\frac{-6}{-5}$ is $\frac{-6}{5}$. (iv) Additive inverse of $\frac{2}{-9}$ is $\frac{2}{9}$.

(v) Additive inverse of $\frac{19}{-6}$ is $\frac{19}{6}$.

3. Verify that $-(-x) = x$ for:

(i) $x = \frac{11}{15}$ (ii) $x = -\frac{13}{17}$

Ans. (i) Putting $x = \frac{11}{15}$ in $-(-x) = x$,

$$-\left(-\frac{11}{15}\right) = \frac{11}{15} \Rightarrow \frac{11}{15} = \frac{11}{15}$$

\Rightarrow L.H.S. = R.H.S.

Hence, verified.

(ii) Putting $x = \frac{-13}{17}$ in $-(-x) = x$,

$$-\left\{-\left(\frac{-13}{17}\right)\right\} = \frac{-13}{17} \Rightarrow \frac{-13}{17} = \frac{-13}{17}$$

\Rightarrow L.H.S. = R.H.S.

Hence, verified.

4. Find the multiplicative inverse of the following:

(i) -13 (ii) $\frac{-13}{19}$ (iii) $\frac{1}{5}$

(iv) $\frac{-5}{8} \times \frac{-3}{7}$ (v) $-1 \times \frac{-2}{5}$ (vi) -1

Ans. We know that multiplicative inverse of a rational number a is $\left(\frac{1}{a}\right)$, such that

$$a \times \frac{1}{a} = 1.$$

(i) Multiplicative inverse of -13 is $\frac{-1}{13}$.

(ii) Multiplicative inverse of $\frac{-13}{19}$ is $\frac{-19}{13}$.

(iii) Multiplicative inverse of $\frac{1}{5}$ is 5.

(iv) Multiplicative inverse of $\frac{-5}{8} \times \frac{-3}{7} = \frac{15}{56}$ is $\frac{56}{15}$.

(v) Multiplicative inverse of $-1 \times \frac{-2}{5} = \frac{2}{5}$ is $\frac{5}{2}$.

(vi) Multiplicative inverse of -1 is $\frac{1}{-1} = -1$

5. Name the property under multiplication used in each of the following:

(i) $\frac{-4}{5} \times 1 = 1 \times \frac{-4}{5}$

(ii) $-\frac{13}{17} \times \frac{-2}{7} = \frac{-2}{7} \times \frac{-13}{17}$

(iii) $\frac{-19}{29} \times \frac{29}{-19} = 1$

Ans. (i) 1 is the multiplicative identity.

(ii) commutativity property.

(iii) Multiplicative Inverse property.

6. Multiply $\frac{6}{13}$ by the reciprocal of $\frac{-7}{16}$.

Ans. The reciprocal of $\frac{-7}{16}$ is $\frac{-16}{7}$.

According to the question,

$$\frac{6}{13} \times \left(\frac{-16}{7} \right) = \frac{-96}{91}$$

7. Tell what property allows you to compute

$$\frac{1}{3} \times \left(6 \times \frac{4}{3} \right) \text{ as } \left(\frac{1}{3} \times 6 \right) \times \frac{4}{3}.$$

Ans. By using associative property of multiplication,

we will compute as $a \times (b \times c) = (a \times b) \times c$.

8. Is $\frac{8}{9}$ the multiplicative inverse of $-1\frac{1}{8}$? Why or why not?

Ans. Since multiplicative inverse of a rational number a is $\left(\frac{1}{a}\right)$, if $a \times \frac{1}{a} = 1$.

$$\text{Therefore, } \frac{8}{9} \times \left(-1\frac{1}{8}\right) = \frac{8}{9} \times \frac{-9}{8} = -1$$

But its product must be positive 1.

Therefore, $\frac{8}{9}$ is not the multiplicative inverse of $\left(-1\frac{1}{8}\right)$.

9. Is 0.3 the multiplicative inverse of $3\frac{1}{3}$? Why or why not?

Ans. Since multiplicative inverse of a rational number a is $\left(\frac{1}{a}\right)$, if $a \times \frac{1}{a} = 1$.

$$\text{Therefore, } 0.3 \times 3\frac{1}{3} = \frac{3}{10} \times \frac{10}{3} = 1$$

Therefore, Yes 0.3 is the multiplicative inverse of $3\frac{1}{3}$.

10. Write:

(i) The rational number that does not have a reciprocal.

(ii) The rational numbers that are equal to their reciprocals.

(iii) The rational number that is equal to its negative.

Ans.(i) 0

(ii) 1 and -1

(iii) 0

11. Fill in the blanks:

(i) Zero has _____ reciprocal.

(ii) The numbers _____ and _____ are their own reciprocals.

(iii) The reciprocal of -5 is _____.

(iv) Reciprocal of $\frac{1}{x}$, where $x \neq 0$ is _____.

(v) The product of two rational numbers is always a _____.

(vi) The reciprocal of a positive rational number is _____

Ans. (i) No

(ii) 1, -1

(iii) $-\frac{1}{5}$

(iv) x

(v) Rational Number

(vi) Positive