

NCERT SOLUTIONS OF Rational Numbers

Exercise 1

Question 1:

Using appropriate properties find:

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

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

Answer

(i) Using commutativity property of rational numbers

$$-\frac{2}{3} \times \frac{3}{5} + \frac{5}{2} - \frac{3}{5} \times \frac{1}{6} = -\frac{2}{3} \times \frac{3}{5} - \frac{3}{5} \times \frac{1}{6} + \frac{5}{2}$$

Now using Distributivity property

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

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

$$= \left(-\frac{3}{6}\right) + \frac{5}{2} = \left(\frac{-3 + 5 \times 3}{6}\right) = \left(\frac{-3 + 15}{6}\right)$$

$$= \frac{12}{6} = 2$$

(ii) Using commutativity property of rational numbers

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

Now using Distributivity property

$$\begin{aligned}
 &= \frac{2}{5} \times \left(-\frac{3}{7} + \frac{1}{14} \right) - \frac{1}{4} \\
 &= \frac{2}{5} \times \left(\frac{-3 \times 2 + 1}{14} \right) - \frac{1}{4} \\
 &= \frac{2}{5} \times \left(\frac{-5}{14} \right) - \frac{1}{4} \\
 &= -\frac{1}{7} - \frac{1}{4} \\
 &= \frac{-4 - 7}{28} = \frac{-11}{28}
 \end{aligned}$$

Question 2

Write the additive inverse of each of the following:

- i) $2/8$
- ii) $-5/9$
- iii) $-6/-5$
- (iv) $2/-9$
- (v) $19/-6$

Answer:

(i) $2/8$

Additive inverse = $-2/8$

(ii) $-5/9$

Additive inverse = $5/9$

(iii) $-6/-5 = 6/5$

Additive inverse = $-6/5$

(iv) $2/-9 = -2/9$

Additive inverse = $2/9$

(v) $19/-6 = -19/6$

Additive inverse = $19/6$

Question 3

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

(i) $x = 11/15$ (ii) $x = -13/17$

Answer:

i) $x = 11/15$

Additive inverse

$$-x = -11/15$$

As $(11/15) + (-11/15) = 0$

The above also represent that additive inverse of $(-11/15)$ is $(11/15)$ or we can say that

$$-(-11/15) = 11/15$$

Or $x = -(-x)$

ii) $x = -13/17$

Additive inverse

$$-x = -(-13/17)$$

As $(-13/17) + (13/17) = 0$

The above also represent that additive inverse of $(13/17)$ is $(-13/17)$ or we can say that

$$-(13/17) = -13/17$$

Or $x = -(-x)$

Question 4

Find the multiplicative inverse of the following.

(i) -13

(ii) $-13/19$

(iii) $1/5$

(iv) $-5/8 \times -3/7$

(v) $-1 \times -2/5$

(vi) -1

Answer

i) -13

Multiplicative inverse $= -1/13$

ii) $-13/19$

Multiplicative inverse $= -19/13$

iii) $1/5$

Multiplicative inverse $= 5$

iv) $-5/8 \times -3/7 = 15/56$

Multiplicative inverse $= 56/15$

v) $-1 \times -2/5 = 2/5$

Multiplicative inverse $= 5/2$

vi) -1

Multiplicative inverse $= -1$

Question 5 :

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

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

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

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

Answer:

i) 1 is the multiplicative identity

ii) Commutatively

iii) Multiplicative inverse

Question 6:

Multiply $6/13$ by the reciprocal of $-7/16$

Answer

Reciprocal of $-7/16 = -16/7$

So $(6/13) \times (-16/7) = -96/91$

Question 7

Tell what property allows you to compute

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

Answer:

Associativity

Question 8

Is $8/9$ the multiplicative inverse of

$$-1\frac{1}{8}$$

Why or why not?

Answer:

$$-1\frac{1}{8}$$

$$= -9/8$$

Now

$$(8/9) \times (-9/8) = -1$$

So it is not the multiplicative inverse

Question 9

Is 0.3 the multiplicative inverse of

$$3\frac{1}{3}$$

Why or why not?

Answer:

$$3\frac{1}{3}$$

$$=10/3$$

Now

$$(3/10) \times (10/3) = 1$$

So it is the multiplicative inverse

Question 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.

Answer:

- i) 0
- ii) 1 and -1
- iii) 0

Question 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 $(1/x)$ where $x \neq 0$ is _____.
- (v) The product of two rational numbers is always a _____.
- (vi) The reciprocal of a positive rational number is _____.

Answer:

- i) No
- ii) 1 and -1
- iii) $-1/5$
- iv) X
- v) Rational Number
- vi) Positive rational number

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