Exercise 1.1 : Solutions of Questions on Page Number : 14

Q1 :

Using appropriate properties find:

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

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

Answer :

(i)

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

(Using commutativity of rational numbers)

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

$$=\left(-\frac{3}{5}\right)\times\left(\frac{2\times2+1}{6}\right)+\frac{5}{2}=\left(-\frac{3}{5}\right)\times\left(\frac{5}{6}\right)+\frac{5}{2}$$

$$=\left(-\frac{3}{6}\right)+\frac{5}{2}=\left(\frac{-3+5\times3}{6}\right)=\left(\frac{-3+15}{6}\right)$$

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

(ii)

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

$$= \frac{2}{5} \times \left(-\frac{3}{7} + \frac{1}{14} \right) - \frac{1}{4} \qquad \text{(By distributivity)}$$

$$= \frac{2}{5} \times \left(\frac{-3 \times 2 + 1}{14} \right) - \frac{1}{4}$$

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

$$= -\frac{1}{7} - \frac{1}{4}$$

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

Q2 :

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) $\frac{19}{-6}$

Answer :

(i) $\frac{2}{8}$

Additive inverse = $-\frac{2}{8}$

(ii) $-\frac{5}{9}$

Additive inverse = $\frac{5}{9}$

(iii) $\frac{-6}{-5} = \frac{6}{5}$

Additive inverse = $\frac{-6}{5}$

(iv) $\frac{2}{-9}=\frac{-2}{9}$

Additive inverse $=\frac{2}{9}$

(v) $\frac{19}{-6}=\frac{-19}{6}$

Additive inverse $=\frac{19}{6}$

Q3 :

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

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

Answer :

(i) $x=\frac{11}{15}$

The additive inverse of $x=\frac{11}{15}$ is $-x=-\frac{11}{15}$ as $\frac{11}{15}+\left(-\frac{11}{15}\right)=0$

This equality $\frac{11}{15}+\left(-\frac{11}{15}\right)=0$ represents that the additive inverse of $-\frac{11}{15}$ is $\frac{11}{15}$ or it can be said that $-\left(-\frac{11}{15}\right)=\frac{11}{15}$ i.e., - (- *x*) = *x*

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

The additive inverse of $x=-\frac{13}{17}$ is $-x=\frac{13}{17}$ as $-\frac{13}{17}+\frac{13}{17}=0$ This equality $-\frac{13}{17}+\frac{13}{17}=0$ represents that the additive inverse of $\frac{13}{17}$ is - $\frac{13}{17}$ i.e., - (- *x*) = *x*

Q4 :

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

Answer :

(i) - 13

Multiplicative inverse = - $\frac{1}{13}$

(ii) $-\frac{13}{19}$

Multiplicative inverse = $-\frac{19}{13}$

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

Multiplicative inverse = 5

(iv) $-\frac{5}{8}\times-\frac{3}{7}=\frac{15}{56}$

Multiplicative inverse $=\frac{56}{15}$

(v) $-1\times-\frac{2}{5}=\frac{2}{5}$

Multiplicative inverse $=\frac{5}{2}$

(vi) - 1

Multiplicative inverse = - 1

Q5 :

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

(i) $\frac{-4}{5}\times1=1\times\frac{-4}{5}=-\frac{4}{5}$

(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) $-\frac{4}{5}\times1=1\times-\frac{4}{5}=-\frac{4}{5}$

1 is the multiplicative identity.

(ii) Commutativity (iii)

Multiplicative inverse Q6

:

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

Answer :

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

Q7 :

Tell what property allows you to compute $\frac{1}{3}\times\left(6\times\frac{4}{3}\right)$ as $\left(\frac{1}{3}\times6\right)\times\frac{4}{3}$.

Answer :
Associativity
Q8 :

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

Answer :

If it is the multiplicative inverse, then the product should be 1.

However, here, the product is not 1 as

$$\frac{8}{9}\times\left(-1\frac{1}{8}\right)=\frac{8}{9}\times\left(-\frac{9}{8}\right)=-1\neq1$$

Q9 :

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

Answer :

$3\frac{1}{3}=\frac{10}{3}$

$0.3 \times 3\frac{1}{3} = 0.3 \times \frac{10}{3}=\frac{3}{10}\times\frac{10}{3}=1$

Here, the product is 1. Hence, 0.3 is the multiplicative inverse of $3\frac{1}{3}$.

Q10 :

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 is a rational number but its reciprocal is not defined.

(ii) 1 and -1 are the rational numbers that are equal to their reciprocals.

(iii) 0 is the rational number that is equal to its negative.

Q11 :

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 _____.

Answer :

(i) No

(ii) 1, - 1

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

(iv) x

(v) Rational number

(vi) Positive rational number

Exercise 1.2 : Solutions of Questions on Page Number : 20

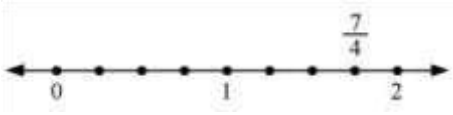
Q1 :

Represent these numbers on the number line.

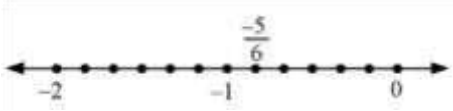
(i) $\frac{7}{4}$ (ii) $\frac{-5}{6}$

Answer :

(i) $\frac{7}{4}$ can be represented on the number line as follows.



(ii) $-\frac{5}{6}$ can be represented on the number line as follows.

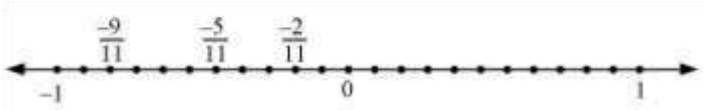


Q2 :

Represent $\frac{-2}{11}, \frac{-5}{11}, \frac{-9}{11}$ on the number line.

Answer :

$\frac{-2}{11}, \frac{-5}{11}, \frac{-9}{11}$ can be represented on the number line as follows.



Q3 :

Write five rational numbers which are smaller than 2.

Answer :

2 can be represented as $\frac{14}{7}$.

Therefore, five rational numbers smaller than 2 are

$\frac{13}{7}, \frac{12}{7}, \frac{11}{7}, \frac{10}{7}, \frac{9}{7}$

Q4 :

Find ten rational numbers between $\frac{-2}{5}$ and $\frac{1}{2}$.

Answer :

$\frac{-2}{5}$ and $\frac{1}{2}$ can be represented as $-\frac{8}{20}$ and $\frac{10}{20}$ respectively.

Therefore, ten rational numbers between $\frac{-2}{5}$ and $\frac{1}{2}$ are

$$-\frac{7}{20}, -\frac{6}{20}, -\frac{5}{20}, -\frac{4}{20}, -\frac{3}{20}, -\frac{2}{20}, -\frac{1}{20}, 0, \frac{1}{20}, \frac{2}{20}$$

Q5 :

(i) Find five rational numbers between $\frac{2}{3}$ and $\frac{4}{5}$

(ii) $\frac{-3}{2}$ and $\frac{5}{3}$

(iii) $\frac{1}{4}$ and $\frac{1}{2}$

Answer :

(i) $\frac{2}{3}$ and $\frac{4}{5}$ can be represented as $\frac{30}{45}$ and $\frac{36}{45}$ respectively.

Therefore, five rational numbers between $\frac{2}{3}$ and $\frac{4}{5}$ are

$\frac{31}{45}, \frac{32}{45}, \frac{33}{45}, \frac{34}{45}, \frac{35}{45}$

(ii) $-\frac{3}{2}$ and $\frac{5}{3}$ can be represented as $-\frac{9}{6}$ and $\frac{10}{6}$ respectively.

Therefore, five rational numbers between $-\frac{3}{2}$ and $\frac{5}{3}$ are

$-\frac{8}{6}, -\frac{7}{6}, -1, -\frac{5}{6}, -\frac{4}{6}$

(iii) $\frac{1}{4}$ and $\frac{1}{2}$ can be represented as $\frac{8}{32}$ and $\frac{16}{32}$ respectively.

Therefore, five rational numbers between $\frac{1}{4}$ and $\frac{1}{2}$ are

$\frac{9}{32}, \frac{10}{32}, \frac{11}{32}, \frac{12}{32}, \frac{13}{32}$

Q6 :
Write five rational numbers greater than - 2.

Answer :

- 2 can be represented as - $\frac{14}{7}$.

Therefore, five rational numbers greater than - 2 are

$-\frac{13}{7}, -\frac{12}{7}, -\frac{11}{7}, -\frac{10}{7}, -\frac{9}{7}$

Q7 :

Find ten rational numbers between $\frac{3}{5}$ and $\frac{3}{4}$.

Answer :

$\frac{3}{5}$ and $\frac{3}{4}$ can be represented as $\frac{48}{80}$ and $\frac{60}{80}$ respectively.

Therefore, ten rational numbers between $\frac{3}{5}$ and $\frac{3}{4}$ are

$$\frac{49}{80}, \frac{50}{80}, \frac{51}{80}, \frac{52}{80}, \frac{53}{80}, \frac{54}{80}, \frac{55}{80}, \frac{56}{80}, \frac{57}{80}, \frac{58}{80}$$