

CBSE NCERT Solutions for Class 8 Mathematics Chapter 1

Back of Chapter Questions

Exercise 1.1

1. Using appropriate properties find.

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

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

Solution:

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

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

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

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

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

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

$$= \frac{4}{2}$$

$$= 2$$

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

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

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

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

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

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

$$= \frac{-2}{14} - \frac{1}{4}$$

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

Hence, $\frac{2}{5} \times \left(\frac{-3}{7}\right) - \frac{1}{6} \times \frac{3}{2} + \frac{1}{14} \times \frac{2}{5} = \frac{-11}{28}$

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

Solution:

We know that for any number a , $a + (-a) = 0$, So, $-a$ is called the additive inverse of a .

(i) Additive inverse of $\frac{2}{8}$ is $\frac{-2}{8}$

(ii) Additive inverse of $\frac{-5}{9}$ is $\frac{5}{9}$

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

Hence, 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) $x = -\frac{13}{17}$

Solution:

(i) The additive inverse of $\frac{11}{15}$ is $-\frac{11}{15}$

$$\text{Since } \frac{11}{15} + \left(-\frac{11}{15}\right) = 0$$

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

Hence verified.

- (ii) The additive inverse of $-\frac{13}{17}$ is $\frac{13}{17}$

$$\text{Since } -\frac{13}{17} + \left(\frac{13}{17}\right) = 0$$

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

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

Solution:

As we know that a rational number $\frac{c}{d}$ is the multiplicative inverse of another rational number $\frac{a}{b}$ if $\frac{a}{b} \times \frac{c}{d} = 1$

$$\text{So, } \frac{c}{d} = \frac{b}{a}$$

Or we can say that multiplicative inverse of $\frac{a}{b}$ is $\frac{b}{a}$

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

$$\text{Since } -13 \times \frac{-1}{13} = 1$$

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

$$\text{Since } \frac{-13}{19} \times \frac{-19}{13} = 1$$

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

Since $\frac{1}{5} \times 5 = 1$

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

Since $\frac{15}{56} \times \frac{56}{15} = 1$

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

Since $\frac{2}{5} \times \frac{5}{2} = 1$

(vi) Multiplicative inverse of -1 is -1

Since $-1 \times -1 = 1$

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

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

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

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

Solution:

(i) Multiplicative identity

(ii) Commutative property

(iii) Multiplicative inverse property

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

Solution:

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

According to the question,

$$\frac{-16}{7} \times \frac{6}{13} = \frac{-96}{91}$$

Hence, Multiplication of $\frac{6}{13}$ by the reciprocal of $\frac{-7}{16}$

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

Solution:

By using associative property of multiplication,

$$a \times (b \times c) = (a \times b) \times c$$

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

Solution:

$$-1\frac{1}{8} \text{ is equal to } \frac{-9}{8}$$

So, multiplicative inverse of $\frac{-9}{8}$ is $\frac{-8}{9}$

$$\text{Since, } \frac{-9}{8} \times \frac{-8}{9} = 1$$

Hence, $\frac{8}{9}$ is not the multiplicative inverse of $-1\frac{1}{8}$

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

Solution:

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

As we know, multiplicative inverse of $\frac{a}{b}$ is $\frac{b}{a}$

So multiplicative inverse of $\frac{3}{10}$ is $\frac{10}{3}$

Which is equal to $3\frac{1}{3}$

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.

Solution:

- (i) 0
- (ii) 1, -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 _____.

Solution:

- (i) Zero has no reciprocal
- (ii) The numbers 1 and -1 are their own reciprocals
- (iii) The reciprocal of -5 is $\frac{1}{-5}$
- (iv) Reciprocal of $\frac{1}{x}$, where $x \neq 0$ is x
- (v) The product of two rational number is always a rational number.
- (vi) The reciprocal of a positive rational number is positive.

Exercise 1.2

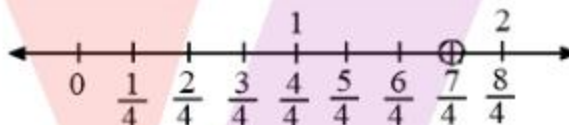
1. Represent these numbers on the number line

(i) $\frac{7}{4}$

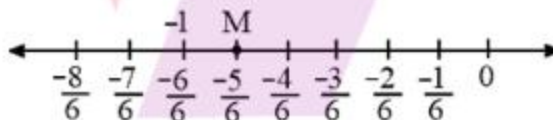
(ii) $\frac{-5}{6}$

Solution:

(i) $\frac{7}{4} = 1\frac{3}{4}$



(ii) Let $M = \frac{-5}{6}$



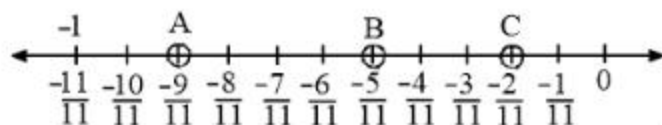
2. Represent $\frac{-2}{11}$, $\frac{-5}{11}$, $\frac{-9}{11}$ on the number line.

Solution:

Let $\frac{-2}{11} = C$,

$\frac{-5}{11} = B$ and

$\frac{-9}{11} = A$



3. Write five rational numbers which are smaller than 2.

Solution:

The rational numbers smaller than 2 are

- (i) $\frac{1}{3}$
 (ii) $\frac{2}{3}$
 (iii) $\frac{5}{3}$
 (iv) $\frac{4}{3}$
 (v) $\frac{1}{2}$
4. Find ten rational numbers between $\frac{-2}{5}$ and $\frac{1}{2}$.

Solution:

Rational numbers are $\frac{-2}{5}$ and $\frac{1}{2}$

Here, L.C.M of 5 and 2 is 10.

$$\text{So, } \frac{-2}{5} = \frac{-2}{5} \times \frac{2}{2} = \frac{-4}{10}$$

$$\text{Also, } \frac{1}{2} = \frac{1}{2} \times \frac{5}{5} = \frac{5}{10}$$

$$\text{Again, } \frac{-4}{10} = \frac{-4}{10} \times \frac{2}{2} = \frac{-8}{20}$$

$$\text{and, } \frac{5}{10} = \frac{5}{10} \times \frac{2}{2} = \frac{10}{20}$$

$$\text{Hence, } \frac{-2}{5} = \frac{-8}{20} \text{ and } \frac{1}{2} = \frac{10}{20}$$

∴ Ten rational numbers between $\frac{-2}{5}$ and $\frac{1}{2}$ are $\frac{-7}{20}, \frac{-6}{20}, \frac{-5}{20}, \frac{-4}{20}, \frac{-3}{20}, \frac{-2}{20}, \frac{-1}{20}, 0, \frac{1}{20}, \frac{2}{20}$

5. Find five rational numbers between

(i) $\frac{2}{3}$ and $\frac{4}{5}$

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

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

Solution:

(i) $\frac{2}{3}$ and $\frac{4}{5}$

L.C.M. of 3 and 5 is 15

So, $\frac{2}{3} = \frac{2}{3} \times \frac{5}{5} = \frac{10}{15}$

and $\frac{4}{5} = \frac{4}{5} \times \frac{3}{3} = \frac{12}{15}$

Again, $\frac{10}{15} = \frac{10}{15} \times \frac{4}{4} = \frac{40}{60}$

and $\frac{12}{15} = \frac{12}{15} \times \frac{4}{4} = \frac{48}{60}$

Hence, $\frac{2}{3} = \frac{40}{60}$ and $\frac{4}{5} = \frac{48}{60}$

∴ Five rational numbers between $\frac{2}{3}$ and $\frac{4}{5}$ are $\frac{41}{60}, \frac{42}{60}, \frac{43}{60}, \frac{44}{60}, \frac{45}{60}$

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

LCM of 2 and 3 is 6

So, $\frac{-3}{2} = \frac{-3}{2} \times \frac{3}{3} = \frac{-9}{6}$

and $\frac{5}{3} = \frac{5}{3} \times \frac{2}{2} = \frac{10}{6}$

Hence, $\frac{-3}{2} = \frac{-9}{6}$ and $\frac{5}{3} = \frac{10}{6}$

∴ Five rational numbers between $\frac{-3}{2}$ and $\frac{5}{3}$ are $\frac{-2}{6}, \frac{-1}{6}, 0, \frac{1}{6}, \frac{2}{6}$

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

LCM of 4 and 2 is 4

So, $\frac{1}{4} = \frac{1}{4} \times \frac{1}{1} = \frac{1}{4}$

& $\frac{1}{2} = \frac{1}{2} \times \frac{2}{2} = \frac{2}{4}$

Again, $\frac{1}{4} = \frac{1}{4} \times \frac{8}{8} = \frac{8}{32}$

and $\frac{2}{4} = \frac{2}{4} \times \frac{8}{8} = \frac{16}{32}$

Hence, $\frac{1}{4} = \frac{8}{32}$ and $\frac{1}{2} = \frac{16}{32}$

∴ Five rational numbers between $\frac{1}{4}$ and $\frac{1}{2}$ are $\frac{9}{32}, \frac{10}{32}, \frac{11}{32}, \frac{12}{32}, \frac{13}{32}$.

6. Write five rational numbers greater than -2

Solution:

The rational numbers greater than -2 are

(i) $\frac{1}{3}$

(ii) $\frac{2}{3}$

(iii) $\frac{5}{3}$

(iv) $\frac{4}{3}$

(v) $\frac{1}{2}$

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

Solution:

$\frac{3}{5}$ and $\frac{3}{4}$

LCM of 5 and 4 = 20

So, $\frac{3}{5} = \frac{3}{5} \times \frac{4}{4} = \frac{12}{20}$

and $\frac{3}{4} = \frac{3}{4} \times \frac{5}{5} = \frac{15}{20}$

Again, $\frac{12}{20} = \frac{12}{20} \times \frac{8}{8} = \frac{96}{160}$

& $\frac{15}{20} = \frac{15}{20} \times \frac{8}{8} = \frac{120}{160}$

∴ 10 Rational numbers between $\frac{3}{5}$ and $\frac{3}{4}$ are

$$\frac{97}{160}, \frac{98}{160}, \frac{99}{160}, \frac{100}{160}, \frac{101}{160}, \frac{102}{160}, \frac{103}{160}, \frac{104}{160}, \frac{105}{160}, \frac{106}{160}$$

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