# NCERT SOLUTIONS

## CLASS - 8TH

Class : 8th
Subject : Maths
Chapter : 1
Chapter Name : Rational Numbers

**Exercise 1.1**

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)
$= \left(-\frac{3}{5}\right) \times \left(\frac{2}{3} + \frac{1}{6}\right) + \frac{5}{2}$ (Distributivity)
$= \left(-\frac{3}{5}\right) \times \left(\frac{2 \times 2 + 1}{6}\right) + \frac{5}{2} = \left(-\frac{3}{5}\right) \times \left(\frac{5}{6}\right) + \frac{5}{2}$
$= \left(-\frac{3}{6}\right) + \frac{5}{2} = \left(\frac{-3 + 5 \times 3}{6}\right) = \left(\frac{-3 + 15}{6}\right)$
$= \frac{12}{6} = 2$

(ii) $\frac{2}{5} \times \left(-\frac{3}{7}\right) - \frac{1}{6} \times \frac{3}{2} + \frac{1}{14} \times \frac{2}{5} = \frac{2}{5} \times \left(-\frac{3}{7}\right) + \frac{1}{14} \times \frac{2}{5} - \frac{1}{6} \times \frac{3}{2}$ (By commutativity)
$= \frac{2}{5} \times \left(-\frac{3}{7} + \frac{1}{14}\right) - \frac{1}{4}$ (By distributivity)
$= \frac{2}{5} \times \left(\frac{-3 \times 2 + 1}{14}\right) - \frac{1}{4}$
$= \frac{2}{5} \times \left(\frac{-5}{14}\right) - \frac{1}{4}$
$= -\frac{1}{7} - \frac{1}{4}$
$= \frac{-4 - 7}{28} = \frac{-11}{28}$

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

(ii)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 $= \frac{19}{6}$

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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 $_{is}^{x=\frac{11}{15}} - x = -\frac{11}{15}$ 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 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.,

$-(-x) = x$

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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

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Q5 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) Commutativity
(iii) Multiplicative inverse

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Q6 Multiply $\frac{6}{13}$ by the reciprocal of $\frac{-7}{16}$.

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

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Q7 Tell what property allows you to compute $\frac{1}{3} \times \left( 6 \times \frac{4}{3} \right)$ as $\left( \frac{1}{3} \times 6 \right) \times \frac{4}{3}$

Answer. Associativity

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

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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 1 x , where x ≠ 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
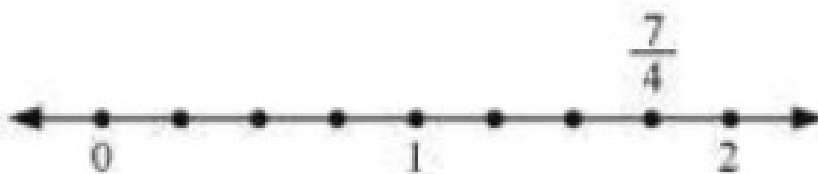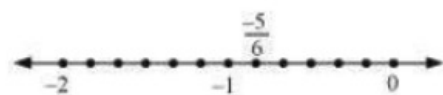(vi) Positive rational number

## Exercise 1.2

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.

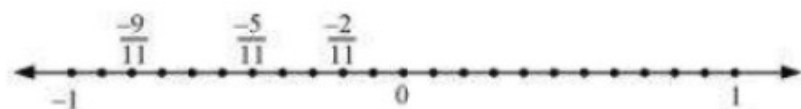(ii) $-\dfrac{5}{6}$ can be represented on the number line as follows.

Q2 Represent $\dfrac{-2}{11}, \dfrac{-5}{11}, \dfrac{-9}{11}$ on the number line.

Answer.

$\dfrac{-2}{11}, \dfrac{-5}{11}, \dfrac{-9}{11}$ 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 $\dfrac{14}{7}$

Therefore, five rational numbers smaller than 2 are

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

Q4 Find ten rational numbers between $\dfrac{-2}{5}$ and $\dfrac{1}{2}$

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

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

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

Q5 Find five rational numbers between.
(i) $\dfrac{2}{3}$ and $\dfrac{4}{5}$
(ii) $\dfrac{-3}{2}$ and $\dfrac{5}{3}$
(iii) $\dfrac{1}{4}$ and $\dfrac{1}{2}$

Answer. (i) $\dfrac{2}{3}$ and $\dfrac{4}{5}$ can be represented as $\dfrac{30}{45}$ and $\dfrac{36}{45}$ 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 $\frac{16}{32}$

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

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

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Q7 Find ten rational numbers $\frac{3}{5}$ 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
$\frac{49}{80}, \frac{50}{80}, \frac{51}{80}, \frac{52}{80}, \frac{53}{80}, \frac{54}{80}, \frac{55}{80}, \frac{56}{80}, \frac{57}{80}, \frac{58}{80}$

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