

EXERCISE 1.1

1. Using appropriate properties and find.

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

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

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

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

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

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

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

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

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

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

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

4. Find the multiplicative inverse of the following.

$$(i) -13$$

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

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

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

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

$$(vi) -1$$

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

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

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

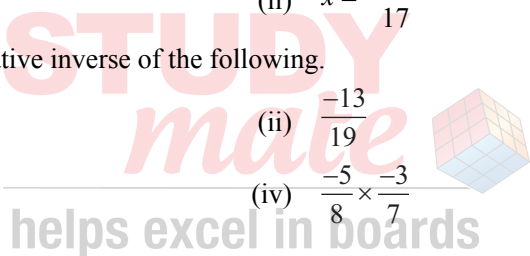
$$(iii) -\frac{19}{29} \times \frac{29}{-19} = 1$$

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

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

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

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



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.

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 _____.

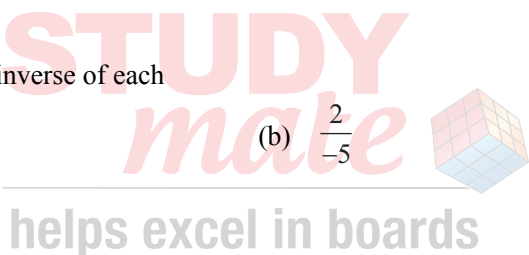
TEST YOURSELF - R1

1. Write the additive inverse of each

(a) $-\frac{2}{3}$

(b) $\frac{2}{-5}$

(c) $\frac{13}{-5}$



2. Simplify:

(a) $\frac{-2}{5} - \left(\frac{-3}{10}\right) - \left(\frac{-4}{15}\right)$

(b) $\frac{5}{3} - \frac{7}{6} + \left(\frac{-2}{3}\right)$

(c) $\frac{-3}{2} + \left(\frac{5}{4} - \frac{7}{4}\right)$

3. Verify that $(x \times y)^{-1} = x^{-1} \times y^{-1}$

when $x = \frac{-2}{3}$ and $y = \frac{-3}{5}$

4. Verify that $(x + y)^{-1} = \frac{1}{x + y}$ when

$x = \frac{2}{3}$ and $y = \frac{3}{5}$

5. Identify the properties associated with the following:

(i) $\frac{-5}{9} \times \frac{3}{5} = \frac{3}{5} \times \left(\frac{-5}{9}\right)$

(ii) $\frac{1}{2} \times \left(\frac{2}{3} \times \frac{3}{4}\right) = \left(\frac{1}{2} \times \frac{2}{3}\right) \times \frac{3}{4}$

$$(iii) \quad \frac{1}{2} \times \left(\frac{2}{3} + \frac{3}{4} \right) = \frac{1}{2} \times \frac{2}{3} + \frac{1}{2} \times \frac{3}{4}$$

6. Divide the sum of $2\frac{1}{4}$ and $5\frac{1}{5}$ by the product of $2\frac{1}{4}$ and $\frac{2}{3}$.
7. Divide the difference of $\frac{12}{7}$ and $\frac{13}{4}$ by the product of $\frac{4}{5}$ and $\frac{25}{2}$.
8. By which rational number should we divide $\frac{22}{7}$, so as to get the number $\frac{-11}{24}$.
9. If $x = \frac{2}{3}$, $y = \frac{4}{5}$, $z = \frac{3}{4}$, then show that $x \div (y + z) \neq (x \div y) + (x \div z)$
10. Prove that $\frac{2}{7} \times \left(\frac{11}{22} \times \frac{-15}{22} \right) = \left(\frac{2}{7} \times \frac{11}{22} \right) \times \frac{-15}{22}$

EXERCISE 1.2

1. Represent these numbers on the number line.
 - (i) $\frac{7}{4}$
 - (ii) $\frac{-5}{6}$
2. Represent $\frac{-2}{11}$, $\frac{-5}{11}$, $\frac{-9}{11}$ on the number line.
3. Write five rational numbers which are smaller than 2.
4. Find ten rational numbers between $\frac{-2}{5}$ and $\frac{1}{2}$.
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 $\frac{1}{2}$
6. Write five rational numbers greater than -2 .
7. Find ten rational numbers between $\frac{3}{5}$ and $\frac{3}{4}$.

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

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

3. (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. 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. (i) 1 is the multiplicative identity.

(ii) Commutative.

(iii) Multiplicative Inverse property.

6. (i) 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. By using associative property of multiplication, we will compute as $a \times (b \times c) = (a \times b) \times c$.
8. Since multiplicative inverse of a rational number a is $\left(\frac{1}{a}\right)$, where $a \times \frac{1}{a} = 1$.

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

But its product must be positive 1.

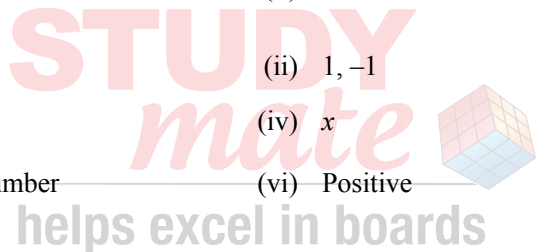
$$\text{Therefore, } \frac{8}{9} \text{ is not the multiplicative inverse of } \left(-1\frac{1}{8}\right).$$

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

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

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

10. (i) 0 (ii) 1 and -1
 (iii) 0
11. (i) No (ii) 1, -1
 (iii) $\frac{-1}{5}$ (iv) x
 (v) Rational Number (vi) Positive



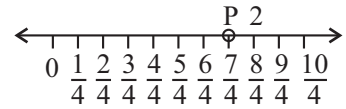
Test Yourself - R1

1. (a) $\frac{2}{3}$ (b) $\frac{2}{5}$
 (c) $\frac{13}{5}$
2. (a) $\frac{1}{6}$ (b) $-\frac{1}{6}$
 (c) -2
5. (i) Commutative property (ii) Associative property
 (iii) Distributive property
6. $4\frac{29}{30}$ 7. $-\frac{43}{280}$
8. $-6\frac{6}{7}$

Exercise – 1.2

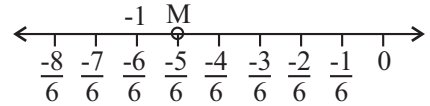
1. (i) $\frac{7}{4} = 1\frac{3}{4}$

Here, $P 1\frac{3}{4} = \frac{7}{4}$

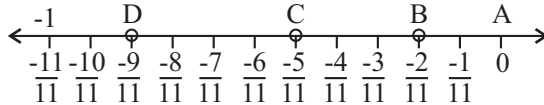


(ii) $\frac{-5}{6}$

Here, $M = \frac{-5}{6}$



2. Here, $B = \frac{-2}{11}$, $C = \frac{-5}{11}$ and $D = \frac{-9}{11}$



3. $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{-1}{2}$, $\frac{-1}{5}$ and so on.

4. $\frac{-2}{5}$ and $\frac{1}{2}$

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

$\therefore \frac{-2}{5} \times \frac{2}{2} = \frac{-4}{10}$ and $\frac{1}{2} \times \frac{5}{5} = \frac{5}{10}$

Again $\frac{-4}{10} \times \frac{2}{2} = \frac{-8}{20}$ and $\frac{5}{10} \times \frac{2}{2} = \frac{10}{20}$

\therefore Ten rational number 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. (i) $\frac{2}{3}$ and $\frac{4}{5}$

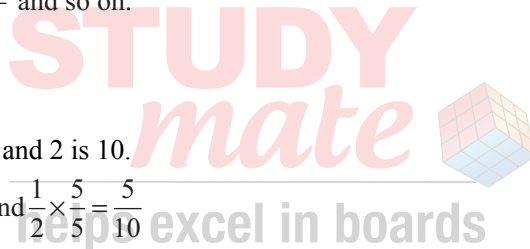
L.C.M. of 3 and 5 is 15.

$\therefore \frac{2}{3} \times \frac{5}{5} = \frac{10}{15}$ and $\frac{4}{5} \times \frac{3}{3} = \frac{12}{15}$

Again $\frac{10}{15} \times \frac{4}{4} = \frac{40}{60}$ and $\frac{12}{15} \times \frac{4}{4} = \frac{48}{60}$

\therefore 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 $\frac{5}{3}$

L.C.M. of 2 and 3 is 6.

$$\therefore \frac{-3}{2} \times \frac{3}{3} = \frac{-9}{6} \text{ and } \frac{5}{3} \times \frac{2}{2} = \frac{10}{6}$$

\therefore Five rational numbers between $\frac{-3}{2}$ and $\frac{5}{3}$ are $\frac{-8}{6}, \frac{-7}{6}, 0, \frac{1}{6}, \frac{2}{6}$.

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

L.C.M. of 4 and 2 is 4.

$$\therefore \frac{1}{4} \times \frac{1}{1} = \frac{1}{4} \text{ and } \frac{1}{2} \times \frac{2}{2} = \frac{2}{4}$$

Again $\frac{1}{4} \times \frac{8}{8} = \frac{8}{32}$ and $\frac{2}{4} \times \frac{8}{8} = \frac{16}{32}$

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

6. Five rational number greater than -2 are :

$$\frac{-3}{2}, -1, \frac{-1}{2}, 0, \frac{1}{2}$$

[Other rational numbers may also be possible]

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

L.C.M. of 5 and 4 is 20.

$$\therefore \frac{3}{5} \times \frac{4}{4} = \frac{12}{20} \text{ and } \frac{3}{4} \times \frac{5}{5} = \frac{15}{20}$$

Again $\frac{12}{20} \times \frac{4}{4} = \frac{12}{20}$ and $\frac{3}{4} \times \frac{5}{5} = \frac{15}{20}$

\therefore Ten rational numbers between $\frac{3}{5}$ and $\frac{3}{4}$ are :

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

