Mathematics

(Chapter – 9) (Rational Numbers)
(Class – VII)

Exercise 9.1

Question 1:

List five rational numbers between:

(i)	–1 and 0	(ii)	–2 and –1
(iii)	$\dfrac{-4}{5}$ and $\dfrac{-2}{3}$	(iv)	$\dfrac{-1}{2}$ and $\dfrac{2}{3}$

Answer 1:

(i)   –1 and 0

Let us write –1 and 0 as rational numbers with denominator 6.

$$\Rightarrow \quad -1 = \frac{-6}{6} \text{ and } 0 = \frac{0}{6}$$

$$\therefore \quad \frac{-6}{6} < \frac{-5}{6} < \frac{-4}{6} < \frac{-3}{6} < \frac{-2}{6} < \frac{-1}{6} < 0$$

$$\Rightarrow \quad -1 < \frac{-5}{6} < \frac{-2}{3} < \frac{-1}{2} < \frac{-1}{3} < \frac{-1}{6} < 0$$

Therefore, five rational numbers between –1 and 0 would be
$$\frac{-5}{6}, \frac{-2}{3}, \frac{-1}{2}, \frac{-1}{3}, \frac{-1}{6}$$

(ii)   –2 and –1

Let us write –2 and –1 as rational numbers with denominator 6.

$$\Rightarrow \quad -2 = \frac{-12}{6} \text{ and } -1 = \frac{-6}{6}$$

$$\therefore \quad \frac{-12}{6} < \frac{-11}{6} < \frac{-10}{6} < \frac{-9}{6} < \frac{-8}{6} < \frac{-7}{6} < \frac{-6}{6}$$

$$\Rightarrow \quad -2 < \frac{-11}{6} < \frac{-5}{3} < \frac{-3}{2} < \frac{-4}{3} < \frac{-7}{6} < -1$$

Therefore, five rational numbers between –2 and –1 would be
$$\frac{-11}{6}, \frac{-5}{3}, \frac{-3}{2}, \frac{-4}{3}, \frac{-7}{6}$$

Rational numbers

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

Let us write $\frac{-4}{5}$ and $\frac{-2}{3}$ as rational numbers with the same denominators.

$\Rightarrow \quad \frac{-4}{5} = \frac{-36}{45}$ and $\frac{-2}{3} = \frac{-30}{45}$

$\therefore \quad \frac{-36}{45} < \frac{-35}{45} < \frac{-34}{45} < \frac{-33}{45} < \frac{-32}{45} < \frac{-31}{45} < \frac{-30}{45}$

$\Rightarrow \quad \frac{-4}{5} < \frac{-7}{9} < \frac{-34}{45} < \frac{-11}{15} < \frac{-32}{45} < \frac{-31}{45} < \frac{-2}{3}$

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

$\frac{-7}{9}, \frac{-34}{45}, \frac{-11}{15}, \frac{-32}{45}, \frac{-31}{45}, \frac{-2}{3}$

(iv) $\frac{-1}{2}$ and $\frac{2}{3}$

Let us write $\frac{-1}{2}$ and $\frac{2}{3}$ as rational numbers with the same denominators.

$\Rightarrow \quad \frac{-1}{2} = \frac{-3}{6}$ and $\frac{2}{3} = \frac{4}{6}$

$\therefore \quad \frac{-3}{6} < \frac{-2}{6} < \frac{-1}{6} < 0 < \frac{1}{6} < \frac{2}{6} < \frac{3}{6} < \frac{4}{6}$

$\Rightarrow \quad \frac{-1}{2} < \frac{-1}{3} < \frac{-1}{6} < 0 < \frac{1}{6} < \frac{1}{3} < \frac{1}{2} < \frac{2}{3}$

Therefore, five rational numbers between $\frac{-1}{2}$ and $\frac{2}{3}$ would be

$\frac{-1}{3}, \frac{-1}{6}, 0, \frac{1}{6}, \frac{1}{3}$.

Question 2:

Write four more rational numbers in each of the following patterns:

(i) $\dfrac{-3}{5}, \dfrac{-6}{10}, \dfrac{-9}{15}, \dfrac{-12}{20}, \ldots\ldots$

(ii) $\dfrac{-1}{4}, \dfrac{-2}{8}, \dfrac{-3}{12}, \ldots\ldots$

(iii) $\dfrac{-1}{6}, \dfrac{2}{-12}, \dfrac{3}{-18}, \dfrac{4}{-24}, \ldots\ldots$

(iv) $\dfrac{-2}{3}, \dfrac{2}{-3}, \dfrac{4}{-6}, \dfrac{6}{-9}, \ldots\ldots$

Answer 2:

(i) $\dfrac{-3}{5}, \dfrac{-6}{10}, \dfrac{-9}{15}, \dfrac{-12}{20}, \ldots\ldots$

$\Rightarrow$ $\dfrac{-3\times1}{5\times1}, \dfrac{-3\times2}{5\times2}, \dfrac{-3\times3}{5\times3}, \dfrac{-3\times4}{5\times4}, \ldots\ldots$

Therefore, the next four rational numbers of this pattern would be

$$\dfrac{-3\times5}{5\times5}, \dfrac{-3\times6}{5\times6}, \dfrac{-3\times7}{5\times7}, \dfrac{-3\times8}{5\times8} = \dfrac{-15}{25}, \dfrac{-18}{30}, \dfrac{-21}{35}, \dfrac{-24}{40}$$

(ii) $\dfrac{-1}{4}, \dfrac{-2}{8}, \dfrac{-3}{12}, \ldots\ldots$

$\Rightarrow$ $\dfrac{-1\times1}{4\times1}, \dfrac{-1\times2}{4\times2}, \dfrac{-1\times3}{4\times3}, \ldots\ldots$

Therefore, the next four rational numbers of this pattern would be

$$\dfrac{-1\times4}{4\times4}, \dfrac{-1\times5}{4\times5}, \dfrac{-1\times6}{4\times6}, \dfrac{-1\times7}{4\times7} = \dfrac{-4}{16}, \dfrac{-5}{20}, \dfrac{-6}{24}, \dfrac{-7}{28},$$

(iii) $\dfrac{-1}{6}, \dfrac{2}{-12}, \dfrac{3}{-18}, \dfrac{4}{-24}, \ldots\ldots$

$\Rightarrow$ $\dfrac{-1\times1}{6\times1}, \dfrac{1\times2}{-6\times2}, \dfrac{1\times3}{-6\times3}, \dfrac{1\times4}{-6\times4}, \ldots\ldots$

Therefore, the next four rational numbers of this pattern would be

$$\dfrac{1\times5}{-6\times5}, \dfrac{1\times6}{-6\times6}, \dfrac{1\times7}{-6\times7}, \dfrac{1\times8}{-6\times8} = \dfrac{5}{-30}, \dfrac{6}{-36}, \dfrac{7}{-42}, \dfrac{8}{-48}$$

(iv) $\quad \dfrac{-2}{3}, \dfrac{2}{-3}, \dfrac{4}{-6}, \dfrac{6}{-9}, \ldots\ldots$

$\Rightarrow \quad \dfrac{-2\times1}{3\times1}, \dfrac{2\times1}{-3\times1}, \dfrac{2\times2}{-3\times2}, \dfrac{2\times3}{-3\times3}, \ldots\ldots$

Therefore, the next four rational numbers of this pattern would be

$\dfrac{2\times4}{-3\times4}, \dfrac{2\times5}{-3\times5}, \dfrac{2\times6}{-3\times6}, \dfrac{2\times7}{-3\times7} = \dfrac{8}{-12}, \dfrac{10}{-15}, \dfrac{12}{-18}, \dfrac{14}{-21}$

Question 3:

Give four rational numbers equivalent to:

(i) $\quad \dfrac{-2}{7}$ $\qquad$ (ii) $\dfrac{5}{-3}$ $\qquad$ (iii) $\quad \dfrac{4}{9}$

Answer 3:

(i) $\quad \dfrac{-2}{7}$

$\dfrac{-2\times2}{7\times2} = \dfrac{-4}{14}, \quad \dfrac{-2\times3}{7\times3} = \dfrac{-6}{21}, \quad \dfrac{-2\times4}{7\times4} = \dfrac{-8}{28}, \quad \dfrac{-2\times5}{7\times5} = \dfrac{-10}{35}$

Therefore, four equivalent rational numbers are $\dfrac{-4}{14}, \dfrac{-6}{21}, \dfrac{-8}{28}, \dfrac{-10}{35}$.

(ii) $\dfrac{5}{-3}$

$\dfrac{5\times2}{-3\times2} = \dfrac{10}{-6}, \quad \dfrac{5\times3}{-3\times3} = \dfrac{15}{-9}, \quad \dfrac{5\times4}{-3\times4} = \dfrac{20}{-12}, \quad \dfrac{5\times5}{-3\times5} = \dfrac{25}{-15}$

Therefore, four equivalent rational numbers are $\dfrac{10}{-6}, \dfrac{15}{-9}, \dfrac{20}{-12}, \dfrac{25}{-15}$.

(iii) $\dfrac{4}{9}$

$\dfrac{4\times2}{9\times2} = \dfrac{8}{18}, \quad \dfrac{4\times3}{9\times3} = \dfrac{12}{27}, \quad \dfrac{4\times4}{9\times4} = \dfrac{16}{36}, \quad \dfrac{4\times5}{9\times5} = \dfrac{20}{45}$
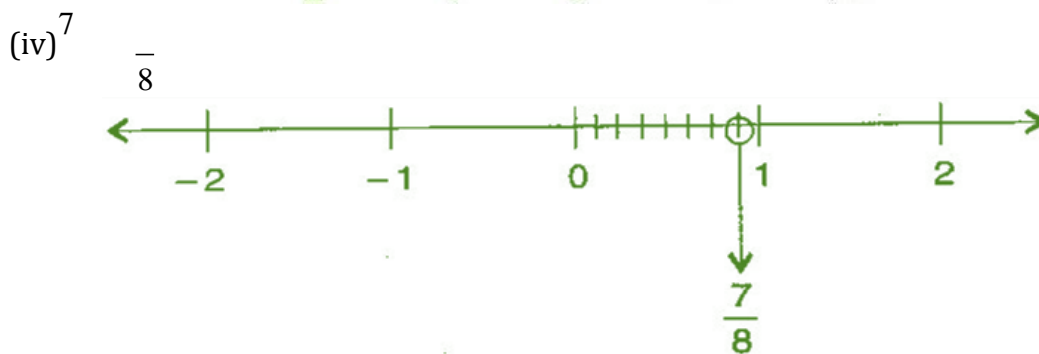
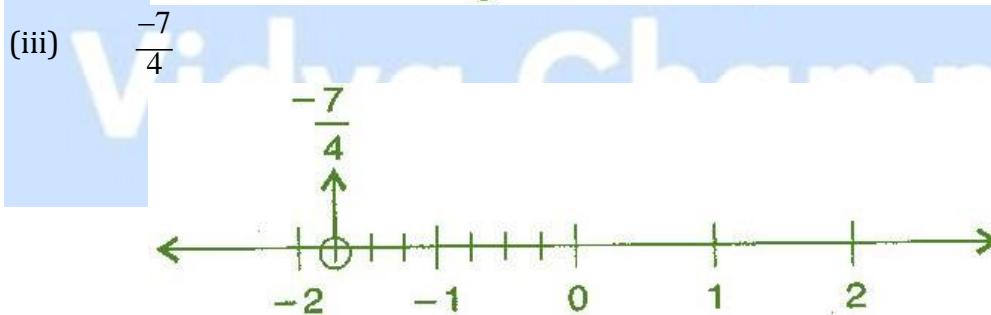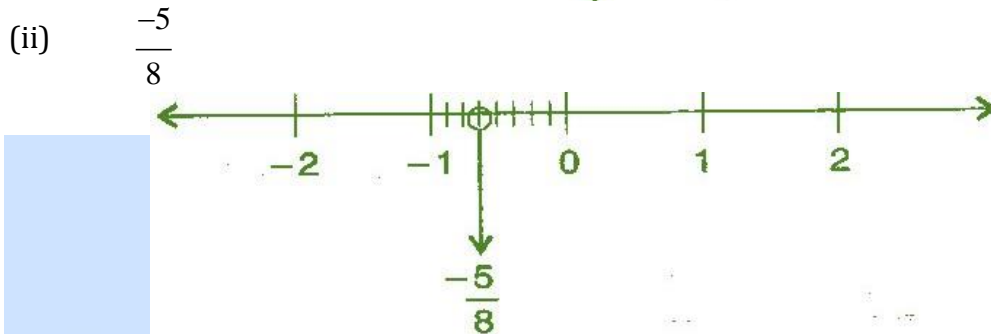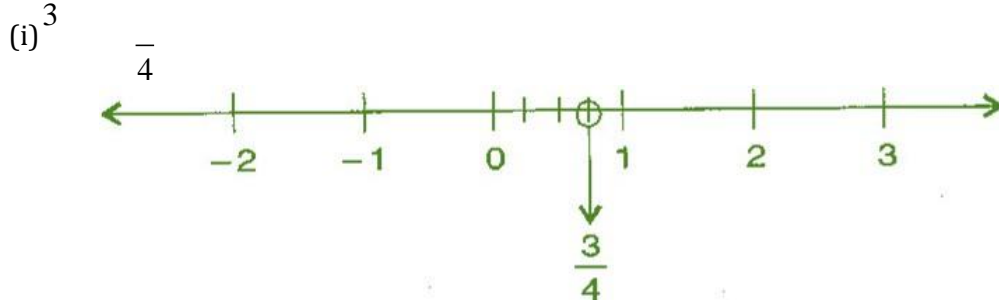Therefore, four equivalent rational numbers are $\dfrac{8}{18}, \dfrac{12}{27}, \dfrac{16}{36}, \dfrac{20}{45}$.

Question 4:

Draw the number line and represent the following rational numbers on it:

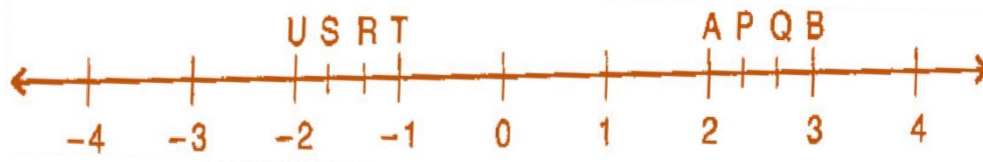(i) $\dfrac{3}{4}$ (ii) $\dfrac{-5}{8}$ (iii) $\dfrac{-7}{4}$ (iv) $\dfrac{7}{8}$

Answer 4:

(i) $\dfrac{3}{4}$

(ii) $\dfrac{-5}{8}$

(iii) $\dfrac{-7}{4}$

(iv) $\dfrac{7}{8}$

Question 5:

The points P, Q, R, S, T, U, A and B on the number line are such that, TR = RS = SU and AP = PQ = QB. Name the rational numbers represented by P, Q, R and S.

Answer 5:

Each part which is between the two numbers is divided into 3 parts.

Therefore, $A = \dfrac{6}{3}$, $P = \dfrac{7}{3}$, $Q = \dfrac{8}{3}$ and $B = \dfrac{9}{3}$

Similarly $T = \dfrac{-3}{3}$, $R = \dfrac{-4}{3}$, $S = \dfrac{-5}{3}$ and $U = \dfrac{-6}{3}$

Thus, the rational numbers represented P, Q, R and S are $\dfrac{7}{3}, \dfrac{8}{3} \dfrac{-4}{3}$ and $\dfrac{-5}{3}$

respectively.

Question 6:

Which of the following pairs represent the same rational numbers:

(i) $\dfrac{-7}{21}$ and $\dfrac{3}{9}$

(ii) $\dfrac{-16}{20}$ and $\dfrac{20}{-25}$

(iii) $\dfrac{-2}{-3}$ and $\dfrac{2}{3}$

(iv) $\dfrac{-3}{5}$ and $\dfrac{-12}{20}$

(v) $\dfrac{8}{-5}$ and $\dfrac{-24}{15}$

(vi) $\dfrac{1}{3}$ and $\dfrac{-1}{9}$

(vii) $\dfrac{-5}{-9}$ and $\dfrac{5}{-9}$

Answer 6:

(i) $\dfrac{-7}{21}$ and $\dfrac{3}{9}$

$\Rightarrow$ $\dfrac{-7}{21} = \dfrac{-1}{3}$ and $\dfrac{3}{9} = \dfrac{1}{3}$ [Converting into lowest term]

$\because$ $\dfrac{-1}{3} \neq \dfrac{1}{3}$

$\therefore$ $\dfrac{-7}{21} \neq \dfrac{3}{9}$

(ii) $\dfrac{-16}{20}$ and $\dfrac{20}{-25}$

$\Rightarrow$ $\dfrac{-16}{20} = \dfrac{-4}{5}$ and $\dfrac{20}{-25} = \dfrac{4}{-5} = \dfrac{-4}{5}$ [Converting into lowest term]

$\because$ $\dfrac{-4}{5} = \dfrac{-4}{5}$

$\therefore$ $\dfrac{-16}{20} = \dfrac{20}{-25}$

(iii) $\dfrac{-2}{-3}$ and $\dfrac{2}{3}$

$\Rightarrow$ $\dfrac{-2}{-3} = \dfrac{2}{3}$ and $\dfrac{2}{3} = \dfrac{2}{3}$ [Converting into lowest term]

$\because$ $\dfrac{2}{3} = \dfrac{2}{3}$

$\therefore$ $\dfrac{-2}{-3} = \dfrac{2}{3}$

(iv) $\dfrac{-3}{5}$ and $\dfrac{-12}{20}$

$\Rightarrow$ $\dfrac{-3}{5} = \dfrac{-3}{5}$ and $\dfrac{-12}{20} = \dfrac{-3}{5}$ [Converting into lowest term]

$\because$ $\dfrac{-3}{5} = \dfrac{-3}{5}$

$\therefore$ $\dfrac{-3}{5} = \dfrac{-12}{20}$

Rational numbers

(v) $\dfrac{8}{-5}$ and $\dfrac{-24}{15}$

$\Rightarrow$ $\dfrac{8}{-5} = \dfrac{-8}{5}$ and $\dfrac{-24}{15} = \dfrac{-8}{5}$ [Converting into lowest term]

$\because$ $\dfrac{-8}{5} = \dfrac{-8}{5}$

$\therefore$ $\dfrac{8}{-5} = \dfrac{-24}{15}$

(vi) $\dfrac{1}{3}$ and $\dfrac{-1}{9}$

$\Rightarrow$ $\dfrac{1}{3} = \dfrac{1}{3}$ and $\dfrac{-1}{9} = \dfrac{-1}{9}$ [Converting into lowest term]

$\because$ $\dfrac{1}{3} \neq \dfrac{-1}{9}$

$\therefore$ $\dfrac{1}{3} \neq \dfrac{-1}{9}$

(vii) $\dfrac{-5}{-9}$ and $\dfrac{5}{-9}$

$\Rightarrow$ $\dfrac{-5}{-9} = \dfrac{5}{9}$ and $\dfrac{5}{-9} = \dfrac{5}{9}$ [Converting into lowest term]

$\because$ $\dfrac{5}{9} \neq \dfrac{5}{-9}$

$\therefore$ $\dfrac{-5}{-9} \neq \dfrac{5}{-9}$

Question 7:

Rewrite the following rational numbers in the simplest form:

(i) $\dfrac{-8}{6}$ (ii) $\dfrac{25}{45}$ (iii) $\dfrac{-44}{72}$ (iv) $\dfrac{-8}{10}$

Answer 7:

(i) $\dfrac{-8}{6} = \dfrac{-8 \div 2}{6 \div 2} = \dfrac{-4}{3}$ [H.C.F. of 8 and 6 is 2]

(ii) $\dfrac{25}{45} = \dfrac{25 \div 5}{45 \div 5} = \dfrac{5}{9}$ [H.C.F. of 25 and 45 is 5]

(iii) $\dfrac{-44}{72} = \dfrac{-44 \div 4}{72 \div 4} = \dfrac{-11}{18}$ [H.C.F. of 44 and 72 is 4]

(iv) $\dfrac{-8}{10} = \dfrac{-8 \div 2}{10 \div 2} = \dfrac{-4}{5}$ [H.C.F. of 8 and 10 is 2]

Question 8:

Fill in the boxes with the correct symbol out of <, > and =:

(i) $\dfrac{-5}{7} \Box \dfrac{2}{3}$ (ii) $\dfrac{-4}{5} \Box \dfrac{-5}{7}$ (iii) $\dfrac{-7}{8} \Box \dfrac{14}{-16}$ (iv) $\dfrac{-8}{5} \Box \dfrac{-7}{4}$

(v) $\dfrac{1}{-3} \Box \dfrac{-1}{4}$ (vi) $\dfrac{5}{-11} \Box \dfrac{-5}{11}$ (vii) $0 \Box \dfrac{-7}{6}$

Answer 8:

(i) $\dfrac{-5}{7} \boxed{<} \dfrac{2}{3}$ Since, the positive number if greater than negative number.

(ii) $\dfrac{-4 \times 7}{5 \times 7} \Box \dfrac{-5 \times 5}{7 \times 5}$ $\Rightarrow$ $\dfrac{-28}{35} \boxed{<} \dfrac{-25}{35}$ $\Rightarrow$ $\dfrac{-4}{5} \boxed{<} \dfrac{-5}{7}$

(iii) $\dfrac{-7 \times 2}{8 \times 2} \Box \dfrac{14 \times (-1)}{-16 \times (-1)}$ $\Rightarrow$ $\dfrac{-14}{16} \boxed{=} \dfrac{-14}{16}$ $\Rightarrow$ $\dfrac{-7}{8} \boxed{=} \dfrac{14}{-16}$

(iv) $\dfrac{-8 \times 4}{5 \times 4} \Box \dfrac{-7 \times 5}{4 \times 5}$ $\Rightarrow$ $\dfrac{-32}{20} \boxed{>} \dfrac{-35}{20}$ $\Rightarrow$ $\dfrac{-8}{5} \boxed{>} \dfrac{-7}{4}$

(v) $\dfrac{1}{-3} \Box \dfrac{-1}{4}$ $\Rightarrow$ $\dfrac{1}{-3} \boxed{<} \dfrac{-1}{4}$

(vi) $\dfrac{5}{-11} \Box \dfrac{-5}{11}$ $\Rightarrow$ $\dfrac{5}{-11} \boxed{=} \dfrac{-5}{11}$

(vii) $0 \quad \boxed{>} \dfrac{-7}{6}$ Since, 0 is greater than every negative number.

Rational numbers

Question 9:

Which is greater in each of the following:

(i) $\dfrac{2}{3}, \dfrac{5}{2}$ (ii) $\dfrac{-5}{6}, \dfrac{-4}{3}$ (iii) $\dfrac{-3}{4}, \dfrac{2}{-3}$ (iv) $\dfrac{-1}{4}, \dfrac{1}{4}$

(v) $-3\dfrac{2}{7}, -3\dfrac{4}{5}$

Answer 9:

(i) $\dfrac{2\times 2}{3\times 2} = \dfrac{4}{6}$ and $\dfrac{5\times 3}{2\times 3} = \dfrac{15}{6}$

Since $\dfrac{4}{6} \boxed{<} \dfrac{15}{6}$ Therefore $\dfrac{2}{3} \boxed{<} \dfrac{5}{2}$

(ii) $\dfrac{-5\times 1}{6\times 1} = \dfrac{-5}{6}$ and $\dfrac{-4\times 2}{3\times 2} = \dfrac{-8}{6}$

Since $\dfrac{-5}{6} \boxed{>} \dfrac{8}{6}$ Therefore $\dfrac{-5}{6} \boxed{>} \dfrac{4}{3}$

(iii) $\dfrac{-3\times 3}{4\times 3} = \dfrac{-9}{12}$ and $\dfrac{2\times(-4)}{-3\times(-4)} = \dfrac{-8}{12}$

Since $\dfrac{-9}{12} \boxed{<} \dfrac{8}{12}$ Therefore $\dfrac{-3}{4} \boxed{<} \dfrac{2}{-3}$

(iv) $\dfrac{-1}{4} \boxed{<} \dfrac{1}{4}$ Since positive number is always greater than negative number.

(v) $-3\dfrac{2}{7} = \dfrac{-23}{7} = \dfrac{-23\times 5}{7\times 5} = \dfrac{-115}{35}$ and $-3\dfrac{4}{5} = \dfrac{-19}{5} = \dfrac{-19\times 7}{5\times 7} = \dfrac{-133}{35}$

Since $\dfrac{-115}{35} \boxed{>} \dfrac{-133}{35}$ Therefore $-3\dfrac{2}{7} \boxed{>} -3\dfrac{4}{5}$

Question 10:

Write the following rational numbers in ascending order:

(i) $\dfrac{-3}{5}, \dfrac{-2}{5}, \dfrac{-1}{5}$

(ii) $\dfrac{1}{3}, \dfrac{-2}{9}, \dfrac{-4}{3}$

(iii) $\dfrac{-3}{7}, \dfrac{-3}{2}, \dfrac{-3}{4}$

Rational numbers

Answer 10:

(i) $\quad \dfrac{-3}{5}, \dfrac{-2}{5}, \dfrac{-1}{5}$

$\Rightarrow \quad \dfrac{-3}{5} < \dfrac{-2}{5} < \dfrac{-1}{5}$

(ii) $\quad \dfrac{1}{3}, \dfrac{-2}{9}, \dfrac{-4}{3} \quad \Rightarrow \quad \dfrac{3}{9}, \dfrac{-2}{9}, \dfrac{-12}{9}$ [Converting into same denominator]

Now $\dfrac{-12}{9} < \dfrac{-2}{9} < \dfrac{3}{9} \quad \Rightarrow \quad \dfrac{-4}{3} < \dfrac{-2}{9} < \dfrac{1}{3}$

(iii) $\quad \dfrac{-3}{7}, \dfrac{-3}{2}, \dfrac{-3}{4}$

$\Rightarrow \quad \dfrac{-3}{2} < \dfrac{-3}{4} < \dfrac{-3}{7}$

Exercise 9.2

Question 1:

Find the sum:

(i) $\dfrac{5}{4} + \left(\dfrac{-11}{4}\right)$

(ii) $\dfrac{5}{3} + \dfrac{3}{5}$

(iii) $\dfrac{-9}{10} + \dfrac{22}{15}$

(iv) $\dfrac{-3}{-11} + \dfrac{5}{9}$

(v) $\dfrac{-8}{19} + \dfrac{(-2)}{57}$

(vi) $\dfrac{-2}{3} + 0$

(vii) $-2\dfrac{1}{3} + 4\dfrac{3}{5}$

Answer 1:

(i) $\dfrac{5}{4} + \left(\dfrac{-11}{4}\right) = \dfrac{5-11}{4} = \dfrac{-6}{4} = \dfrac{-3}{2}$

(ii) $\dfrac{5}{3} + \dfrac{3}{5} = \dfrac{5 \times 5}{3 \times 5} + \dfrac{3 \times 3}{5 \times 3} = \dfrac{25}{15} + \dfrac{9}{15}$ [L.C.M. of 3 and 5 is 15]

$\qquad = \dfrac{25 + 9}{15} = \dfrac{34}{15} = 2\dfrac{4}{15}$

(iii) $\dfrac{-9}{10} + \dfrac{22}{15} = \dfrac{-9 \times 3}{10 \times 3} + \dfrac{22 \times 2}{15 \times 2} = \dfrac{-27}{30} + \dfrac{44}{30}$ [L.C.M. of 10 and 15 is 30]

$\qquad = \dfrac{-27 + 44}{30} = \dfrac{17}{30}$

(iv) $\dfrac{-3}{-11} + \dfrac{5}{9} = \dfrac{-3 \times 9}{-11 \times 9} + \dfrac{5 \times 11}{9 \times 11} = \dfrac{27}{99} + \dfrac{55}{99}$ [L.C.M. of 11 and 9 is 99]

$\qquad = \dfrac{27 + 55}{99} = \dfrac{82}{99}$

(v) $\dfrac{-8}{19} + \dfrac{(-2)}{57} = \dfrac{-8 \times 3}{19 \times 3} + \dfrac{(-2) \times 1}{57 \times 1} = \dfrac{-24}{57} + \dfrac{(-2)}{57}$ [L.C.M. of 19 and 57 is 57]

$\qquad = \dfrac{-24 - 2}{57} = \dfrac{-26}{57}$

(vi) $\dfrac{-2}{3} + 0 = \dfrac{-2}{3}$

Rational numbers

(vii) $-2\dfrac{1}{3}+4\dfrac{3}{5} = \dfrac{-7}{3}+\dfrac{23}{5} = \dfrac{-7\times5}{3\times5}+\dfrac{23\times3}{5\times3} = \dfrac{-35}{15}+\dfrac{69}{15}$ [L.C.M. of 3 and 5 is 15]

$\qquad\qquad = \dfrac{-35+69}{15} = \dfrac{34}{15} = 2\dfrac{4}{15}$

Question 2:

Find:

(i) $\dfrac{7}{24}-\dfrac{17}{36}$

(ii) $\dfrac{5}{63}-\left(\dfrac{-6}{21}\right)$

(iii) $\dfrac{-6}{13}-\left(\dfrac{-7}{15}\right)$

(iv) $\dfrac{-3}{8}-\dfrac{7}{11}$

(v) (v) $-2\dfrac{1}{9}-6$

Answer 2:

(i) $\dfrac{7}{24}-\dfrac{17}{36} = \dfrac{7\times3}{24\times3}-\dfrac{17\times2}{36\times2} = \dfrac{21}{72}-\dfrac{34}{72}$ [L.C.M. of 24 and 36 is 72]

$\qquad = \dfrac{21-34}{72} = \dfrac{-13}{72}$

(ii) $\dfrac{5}{63}-\left(\dfrac{-6}{21}\right) = \dfrac{5\times1}{63\times1}-\left(\dfrac{-6\times3}{21\times3}\right) = \dfrac{5}{63}-\dfrac{-18}{63}$ [L.C.M. of 63 and 21 is 63]

$\qquad = \dfrac{5-(-18)}{63} = \dfrac{5+18}{63} = \dfrac{23}{63}$

(iii) $\dfrac{-6}{13}-\left(\dfrac{-7}{15}\right) = \dfrac{-6\times15}{13\times15}-\left(\dfrac{-7\times13}{15\times13}\right) = \dfrac{-90}{195}-\left(\dfrac{-91}{195}\right)$ [L.C.M. of 13 and 15 is 195]

$\qquad = \dfrac{-90-(-91)}{195} = \dfrac{-90+91}{195} = \dfrac{1}{195}$

(iv) $\dfrac{-3}{8}-\dfrac{7}{11} = \dfrac{-3\times11}{8\times11}-\dfrac{7\times8}{11\times8} = \dfrac{-33}{88}-\dfrac{56}{88}$ [L.C.M. of 8 and 11 is 88]

$\qquad = \dfrac{-33-56}{88} = \dfrac{-89}{88} = -1\dfrac{1}{88}$

(v) $-2\dfrac{1}{9}-6 = \dfrac{-19}{9}-\dfrac{6}{1} = \dfrac{-19\times1}{9\times1}-\dfrac{6\times9}{1\times9}$ [L.C.M. of 9 and 1 is 9]

$\qquad = \dfrac{-19}{9}-\dfrac{54}{9} = \dfrac{-19-54}{9} = \dfrac{-73}{9} = -8\dfrac{1}{9}$

Rational numbers

Question 3:

Find the product:

(i) $\dfrac{9}{2} \times \left(\dfrac{-7}{4} \right)$

(ii) $\dfrac{3}{10} \times (-9)$

(iii) $\dfrac{-6}{5} \times \dfrac{9}{11}$

(iv) $\dfrac{3}{7} \times \left(\dfrac{-2}{5} \right)$

(v) $\dfrac{3}{11} \times \dfrac{2}{5}$

(vi) $\dfrac{3}{-5} \times \dfrac{5}{3}$

Answer 3:

(i) $\dfrac{9}{2} \times \left(\dfrac{-7}{4} \right) = \dfrac{9 \times (-7)}{2 \times 4} = \dfrac{-63}{8} = -7\dfrac{7}{8}$

(ii) $\dfrac{3}{10} \times (-9) = \dfrac{3 \times (-9)}{10} = \dfrac{-27}{10} = -2\dfrac{7}{10}$

(iii) $\dfrac{-6}{5} \times \dfrac{9}{11} = \dfrac{(-6) \times 9}{5 \times 11} = \dfrac{-54}{55}$

(iv) $\dfrac{3}{7} \times \left(\dfrac{-2}{5} \right) = \dfrac{3 \times (-2)}{7 \times 5} = \dfrac{-6}{35}$

(v) $\dfrac{3}{11} \times \dfrac{2}{5} = \dfrac{3 \times 2}{11 \times 5} = \dfrac{6}{55}$

(vi) $\dfrac{3}{-5} \times \left(\dfrac{-5}{3} \right) = \dfrac{3 \times (-5)}{-5 \times 3} = 1$

Question 4:

Find the value of:

(i) $(-4) \div \dfrac{2}{3}$

(ii) $\dfrac{-3}{5} \div 2$

(iii) $\dfrac{-4}{5} \div (-3)$

(iv) $\dfrac{-1}{8} \div \dfrac{3}{4}$

(v) $\dfrac{-2}{13} \div \dfrac{1}{7}$

(vi) $\dfrac{-7}{12} \div \left(\dfrac{2}{13} \right)$

(vii) $\dfrac{3}{13} \div \left(\dfrac{-4}{65} \right)$

Answer 4:

(i) $(-4) \div \dfrac{2}{3} = (-4) \times \dfrac{3}{2} = (-2) \times 3 = -6$

(ii) $\dfrac{-3}{5} \div 2 = \dfrac{-3}{5} \times \dfrac{1}{2} = \dfrac{(-3) \times 1}{5 \times 2} = \dfrac{-3}{10}$

(iii) $\dfrac{-4}{5} \div (-3) = \dfrac{(-4)}{5} \times \dfrac{1}{(-3)} = \dfrac{(-4) \times 1}{5 \times (-3)} = \dfrac{4}{15}$

(iv) $\dfrac{-1}{8} \div \dfrac{3}{4} = \dfrac{-1}{8} \times \dfrac{4}{3} = \dfrac{(-1) \times 1}{2 \times 3} = \dfrac{-1}{6}$

(v) $\dfrac{-2}{13} \div \dfrac{1}{7} = \dfrac{-2}{13} \times \dfrac{7}{1} = \dfrac{(-2) \times 7}{13 \times 1} = \dfrac{-14}{13} = -1\dfrac{1}{13}$

(vi) $\dfrac{-7}{12} \div \left(\dfrac{-2}{13}\right) = \dfrac{-7}{12} \times \dfrac{13}{(-2)} = \dfrac{(-7) \times 13}{12 \times (-2)} = \dfrac{-91}{24} = 3\dfrac{19}{24}$

(vii) $\dfrac{3}{13} \div \left(\dfrac{-4}{65}\right) = \dfrac{3}{13} \times \dfrac{65}{(-4)} = \dfrac{3 \times (-5)}{1 \times 4} = \dfrac{-15}{4} = -3\dfrac{3}{4}$