Chapter 4 Rational Numbers

4. Rational Numbers. VII-class

Exercise - 4.1.

Solution-01:-

(i) -7

(ii) 15

(iii) -17

(iv) 8

(v) 5.

Solution-02:-

(i) 5

(ii) -34

(iii) -82

(iv) 1

(v) any nonzero integer.

Solution-03:-

Numerator = $-3 \times 4 = -12$

Denominator = $(34-23) \times 7-4$

$= 11 \times 3 = 33$

∴ Required Rational number = $\frac{-12}{33}$.

Solution -04:-

$\frac{1}{1}, \frac{-12}{1}, \frac{34}{1}, \frac{-73}{1}, \frac{95}{1}$ can be written as integers as follows.

1, -12, 34, -73, 95

Solution-05:-

$\frac{-15}{1}, \frac{17}{1}, \frac{85}{1}, \frac{-100}{1}$.

Solution-06:-

Smallest three digit number → 100.

Largest four digit number → 9999.

∴ Required rational number = $\frac{100}{9999}$.

solution -07:-

Positive rational number:-

A rational number is said to be positive if its numerator and denominator are either both are positive integers or both negative integers.

Negative Rational Number :-

A rational number is said to be negative if its numerator and denominator are such that one of them is positive integer and another one is a negative integer.

Positive rational numbers → $\frac{-5}{-7}, \frac{7}{4}, \frac{-18}{-7}, \frac{-1}{9}$.

Negative rational numbers → $\frac{12}{-5}, \frac{13}{-9}, \frac{-95}{116}$.

Solution-08 :-

(ii) $\frac{9}{8}$

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

Solution-09 :-

(i) $\frac{-3}{7}$

(iii) $\frac{-9}{83}$.

Exercise - 4.2.

Solution - 01 :-

(i) $\frac{-15}{-28}$.

> In order to express a rational number with positive denominator, we multiply its numerator and denominator by -1, Therefore.

$$\frac{-15}{-28} = \frac{15}{28}$$

(ii) $\frac{6}{-9} = \frac{-6}{9}$.

(iii) $\frac{-28}{-11} = \frac{28}{11}$

(iv) $\frac{19}{-7} = \frac{-19}{7}$.

Solution - 02 :-

(i) In order to express $\frac{3}{5}$ as a rational number with numerator 6, we first find a number which when multiplied by 3 gives 6.

clearly, such number is $6 \div 3 = 2$.

multiplying the Nr and Dr of $\frac{3}{5}$ by 2, we have

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

— Thus, The required rational number is $\frac{6}{10}$.

(ii) Numerator → −15.

clearly, $-15 \div 3 = -5$.

multiplying Nr and Dr of $\frac{3}{5}$ by −5, we get

$$\frac{3}{5} = \frac{3}{5} \times \frac{-5}{-5} = \frac{-15}{-25}$$

(iii) clearly, $21 \div 3 = 7$.

multiplying Nr and Dr of $\frac{3}{5}$ by 7, we get

$$\frac{3}{5} = \frac{3 \times 7}{5 \times 7} = \frac{21}{35}.$$

(iv) clearly $-27 \div 3 = -9$.

multiplying Nr and Dr of $\frac{3}{5}$ by −9, we get

$$\frac{3}{5} = \frac{3 \times -9}{5 \times -9} = \frac{-27}{-45}.$$

Solution −02:-

(i) In order to express $\frac{3}{5}$ as a rational number with denominator −14, we first find a number which when multiplied by 7 gives −14.

clearly, such number is $-14 \div 7 = -2$.

Multiplying the Nr and Dr of $\frac{5}{7}$ by -2, we have,

$$\frac{5}{7} = \frac{5 \times -2}{7 \times -2} = \frac{-10}{-14}.$$

(ii) clearly, $70 \div 7 = 10$.

Multiplying the Nr and Dr of $\frac{5}{7}$ by 10. we have,

$$\frac{5}{7} = \frac{5 \times 10}{7 \times 10} = \frac{50}{70}.$$

(iii) clearly, $-28 \div 7 = -4$.

Multiplying the Nr and Dr of $\frac{5}{7}$ by -4. we have,

$$\frac{5}{7} = \frac{5 \times -4}{7 \times -4} = \frac{-20}{-28}.$$

(iv) clearly, $-84 \div 7 = -12$

Multiplying the Nr and Dr of $\frac{5}{7}$ by -12 we have,

$$\frac{5}{7} = \frac{5 \times -12}{7 \times -12} = \frac{-60}{-84}.$$

solution-04:-

(i) clearly $20 \div 4 = 5$.

Multiplying the Nr and Dr of $\frac{3}{4}$ by 5.

we have,

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

(ii) clearly $36 \div 4 = 9$.

Multiplying the Nr and Dr of $\frac{3}{4}$ by 9.

we have

$$\frac{3}{4} = \frac{3 \times 9}{4 \times 9} = \frac{27}{36}$$

(iii) clearly $44 \div 4 = 11$

Multiplying the Nr and Dr of $\frac{3}{4}$ by 11.

we have,

$$\frac{3}{4} = \frac{3}{4} \times \frac{11}{11} = \frac{33}{44}$$

(iv) clearly, $-80 \div 4 = -20$.

Multiplying the Nr and Dr of $\frac{3}{4}$ by -20

we have,

$$\frac{3}{4} = \frac{3 \times -20}{4 \times -20} = \frac{-60}{-80}.$$

Solution-05:

(i) clearly, $-56 \div 2 = -28$.

Multiplying the Nr and Dr of $\frac{2}{5}$ by -28

we have,

$$\frac{2}{5} = \frac{2 \times -28}{5 \times -28} = \frac{-56}{-140}$$

(ii) clearly, $154 \div 2 = 72$.

Multiplying the Nr and Dr of $\frac{2}{5}$ by 72.

we have,

$$\frac{2}{5} = \frac{2 \times 72}{5 \times 72} = \frac{144}{360}$$

(iii) clearly, $-750 \div 2 = -375$.

Multiplying the Nr and Dr of $\frac{2}{5}$ by -375.

$$\frac{2}{5} = \frac{2 \times -375}{5 \times -375} = \frac{-750}{-1875}.$$

(iv) clearly, $500 \div 2 = 250$.

Multiplying the Nr and Dr of $\frac{2}{5}$ by 250.

$$\frac{2}{5} = \frac{2 \times 250}{5 \times 250} = \frac{500}{1250}.$$

Solution -06:

(i) clearly, $64 \div -192 = -1/3$.

Multiplying the Nr and Dr of $\frac{-192}{108}$ by $\frac{-1}{3}$

we have.

$$\frac{-192}{108} = \frac{-192 \times \frac{-1}{3}}{+108 \times \frac{-1}{3}} = \frac{64}{-36}$$

(ii) clearly $-16 \div -192 = \frac{1}{12}$.

Multiplying the Nr and Dr of $\frac{-192}{108}$ by $\frac{1}{12}$.

we have,

$$\frac{-192}{108} = \frac{-192 \times \frac{1}{12}}{108 \times \frac{1}{12}} = \frac{-16}{9}.$$

(iii) clearly, $32 \div -196 = -\frac{1}{6}$.

Multiplying the Nr and Dr of $\frac{-192}{108}$ by $\frac{-1}{6}$

$$\frac{-192}{108} = \frac{-192 \times \frac{-1}{6}}{108 \times \frac{-1}{6}} = \frac{32}{-18}.$$

(iv) clearly, $-48 \div 196 = -12/49$ $-1/4$

Multiplying the Nr & Dr of $\frac{-192}{108}$ by $\frac{-12}{49}$

$$\frac{-192}{108} = \frac{-192 \times \frac{-12}{49}}{108 \times \frac{-12}{49}} = \frac{-48}{27}.$$

Solution-01

(i) clearly, ~~-294 ÷ 14~~ $14 \div -294 = \frac{-1}{21}$

Multiplying Nr and Dr of $\frac{168}{-294}$ by $\frac{-1}{21}$

$$\frac{168}{-294} = \frac{168 \times \frac{-1}{21}}{-294 \times \frac{-1}{21}} = \frac{-8}{14}.$$

(ii) clearly, $-7 \div -294 = 1/42$.

Multiplying Nr and Dr of $\frac{168}{-294}$ by $\frac{1}{42}$.

$$\frac{168}{-294} = \frac{168 \times \frac{1}{42}}{-294 \times \frac{1}{42}} = \frac{4}{-7}.$$

(iii) clearly, $-49 \div -294 = 1/6$.

Multiplying Nr and Dr of $\frac{168}{-294}$ by $\frac{1}{6}$.

$$\frac{168}{-294} = \frac{168 \times \frac{1}{6}}{-294 \times \frac{1}{6}} = \frac{28}{-49}.$$

(iv) clearly $1470 \div -294 = -5$.

Multiplying Nr and Dr of $\frac{168}{-294}$ by 5.

$$\frac{168}{-294} = \frac{168 \times 5}{-294 \times 5} = -\frac{840}{1470}.$$

Solution-08:-

clearly, $-2 \div -14 = 1/7$.

Multiplying the Nr and Dr of $\frac{-14}{42}$ by $\frac{1}{7}$

we have

$$\frac{-14}{42} = \frac{-14 \times \frac{1}{7}}{42 \times \frac{1}{7}} = \frac{-2}{6} = \frac{-2}{3 \times 2}.$$

Solution-08:-

(ii) clearly, $7 \div -14 = 1/-2$.

Multiplying the Nr and Dr of $\frac{-14}{42}$ by $\frac{1}{-2}$

$$\frac{-14}{42} = \frac{-14 \times \frac{1}{-2}}{42 \times \frac{1}{-2}} = \frac{7}{-21}$$

(iii) Clearly, $42 \div -14 = -3$

Multiplying the Nr and Dr of $\frac{-14}{42}$ by -3.

$$\frac{-14}{42} = \frac{-14 \times -3}{42 \times -3} = \frac{42}{-126}.$$

(iv) clearly, $-70 \div -14 = 5$.

Multiplying the Nr and Dr of $\frac{-70}{-14}$ by 5.

$$\frac{-70}{-14} = 5 \quad \left| \quad \frac{-14 \times 5}{42 \times 5} = \frac{-70}{210} \right.$$

solution-09 :-

$\frac{1}{22}, \frac{2}{3}, \frac{3}{4}, -\frac{6}{7}$

solution-10 :-

$\frac{7}{8}, \frac{64}{16}, \frac{36}{-12}, \frac{5}{-4}, \frac{140}{28}$.

solution-11 :-

(i) $\frac{3}{4}$ and $\frac{5}{12}$.

L.c.m of 4 and 12.

$4 \overline{)4, 12}$
$1, 3$

L.C.M = 12

$\therefore \frac{3}{4} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12}$.

$\frac{9}{12}$ and $\frac{5}{12}$

(ii) L.c.m of 3, 6 and 12 is

$3 \overline{)3, 6, 12}$
$2 \overline{)1, 2, 4}$
$1, 1, 2$

L.C.M = 12.

$\therefore \frac{2}{3} = \frac{8}{12}$; $\frac{7}{6} = \frac{14}{12}$ and $\frac{11}{12}$

$\frac{8}{12}, \frac{14}{12}, \frac{11}{12}$.

(iii) L.c.m of 7, 8, 14 and 21

$$\begin{array}{r|l} 7 & 7, 8, 14, 21 \\ 2 & 1, 8, 2, 3 \\ \hline & 1, 4, 1, 3 \end{array}$$

L.c.m = $7 \times 2 \times 4 \times 3$

= 168.

$\therefore \frac{5}{7} = \frac{5 \times 24}{7 \times 24} = \frac{120}{168}$.

$\frac{3}{8} = \frac{3 \times 21}{8 \times 21} = \frac{63}{168}$.

$\frac{9}{14} = \frac{9 \times 12}{14 \times 12} = \frac{108}{168}$.

$\frac{20}{21} = \frac{20 \times 8}{21 \times 8} = \frac{160}{168}$

$\frac{120}{168}$, $\frac{63}{168}$, $\frac{108}{168}$ and $\frac{160}{168}$.

Exercise-4.3.

Solution-01

(i) We observe that 65 and 84 have no common factor i.e their H.C.F is 1

Therefore, $\frac{65}{84}$ is in Lowest form

(ii) $\frac{-15}{32}$ is in Lowest form [$\because$ H.C.F = 1]

(iii) $\frac{24}{128} = \frac{12}{64}$ which is not in Lowest form

(iv) $\frac{-56}{-32} = \frac{-28}{-16}$ which is not in Lowest form

Solution -02:-

(i) $\frac{4}{22} = \frac{2}{11}$.

(ii) $\frac{-36}{180} = \frac{-1}{5}$

(iii) $\frac{132}{-428} = \frac{34}{-107}$.

$= \frac{-34}{107}$

(iv) $\frac{-32}{-56} = \frac{+8}{+14} = \frac{+4}{+7} = \frac{4}{7}$

Solution-03 :-

(i) $\frac{-5}{7} = \frac{\dots}{35}$

Let .... be x then

$$\frac{-5}{7} = \frac{x}{35}$$

$$x = \frac{-5 \times 35^{5}}{7} = -25.$$

$$\frac{-5}{7} = \frac{y}{49}$$

$$y = \frac{-5 \times 49}{7}$$

$$= -35$$

(ii) $\frac{-4}{-9} = \frac{x}{18} = \frac{12}{y}$

$$\frac{+4}{+9} = \frac{x}{18}$$

$$\Rightarrow x = \frac{4 \times 18}{9}$$

$$= 8$$

$$\frac{x}{18} = \frac{8}{18}.$$

$$\frac{-4}{-9} = \frac{12}{y}$$

$$\Rightarrow y = \frac{12 \times 9}{4}$$

$$\Rightarrow y = 27$$

(iii) $\frac{6}{-13} = \frac{-12}{x} = \frac{24}{y}$

$\frac{6}{-13} = \frac{-12}{x}$

$\Rightarrow x = \frac{-12 \times -13}{6}$

$\Rightarrow x = 26.$

(ii) $\frac{6}{-13} = \frac{24}{y}$

$\Rightarrow y = \frac{24 \times -13}{6}$

$\Rightarrow y = -52.$

(iv) $\frac{-6}{x} = \frac{3}{11} = \frac{y}{-55}$

$\Rightarrow \frac{-6}{x} = \frac{3}{11}$

$\Rightarrow x = \frac{-6 \times 11}{3}$

$\Rightarrow x = -22.$

$\Rightarrow \frac{3}{11} = \frac{y}{-55}$

$\Rightarrow y = \frac{-55 \times 3}{11}$

$\Rightarrow y = -15.$

Exercise -4.4.

Solution-01:

(i) $\frac{2}{10}$.

The greatest common divisor of 2 and 10 is 2.

Dividing the Nr and Dr of $\frac{2}{10}$ by 2, we get

$$\frac{2}{10} = \frac{2 \div 2}{10 \div 2} = \frac{1}{5}.$$

(ii) $\frac{-8}{36}$.

The H.C.F of 8 and 36 is 4.

Dividing the Nr and Dr of $\frac{-8}{36}$ by 4, we get

$$\frac{-8}{36} = \frac{-8 \div 4}{36 \div 4} = \frac{-2}{9}.$$

(iii) $\frac{4}{-16}$.

The H.C.F of 4 and 16 is 4.

Dividing the Nr and Dr of $\frac{4}{-16}$ by 4, we get.

$$\frac{4}{-16} = \frac{4 \div 4}{-16 \div 4} = \frac{-1}{4}.$$

(iv) $\frac{-15}{-35}$.

The H.C.F of +15 and -35 is 5.

Dividing the Nr and Dr of $\frac{-15}{-35}$ by 5, we get.

$$\frac{-15 \div 5}{-35 \div 5} = \frac{3}{7}.$$

(v) $\frac{299}{-161}$

The H.C.F of 299 and -161 is 23.

Dividing the Nr and Dr of $\frac{299}{-161}$ by 23, we get

$$\frac{299}{-161} = \frac{299 \div 23}{-161 \div 23} = \frac{13}{-7}.$$

(vi) $\frac{-63}{-210}$.

The H.C.F of 63 and 210 is 21.

Dividing the Nr and Dr of $\frac{-63}{-210}$ by 21, we get.

$$\frac{-63}{-210} = \frac{-63 \div 21}{-210 \div 21} = \frac{-3}{-10} = \frac{3}{10}.$$

(vii) $\frac{68}{-119}$.

The H.C.F of 68 and 119 is 17.

Dividing the Nr and Dr of $\frac{68}{-119}$ by 17, we get

$$\frac{68}{-119} = \frac{68 \div 17}{-119 \div 17} = \frac{4}{-7}.$$

(viii) $\frac{-195}{275}$.

The H.C.F of 195 and 275 is 5, we get

$$\frac{-195}{275} = \frac{-195 \div 5}{275 \div 5} = \frac{-39}{55}.$$

Exercise-4.5.

solution-01:-

(i) $\frac{-9}{12}$ and $\frac{8}{-12}$.

H.C.F of 9 and 12 is 3

$\therefore \frac{-9}{12} = \frac{-9 \div 3}{12 \div 3} = \frac{-3}{4}$

$\frac{8}{-12} = \frac{8 \div 4}{-12 \div 4} = \frac{2}{-3}$

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

H.C.F of 16 and 20 is 4.

$\frac{-16}{20} = \frac{-16 \div 4}{20 \div 4} = \frac{-4}{5}$.

H.C.F of 20 and -25 is 5

$\frac{20}{-25} = \frac{20 \div 5}{-25 \div 5} = \frac{4}{-5}$.

$\therefore \frac{-16}{20} = \frac{20}{-25}$.

(iii) $\frac{-7}{21}$ and $\frac{3}{-9}$.

H.C.F of 7 and 21 is 7

$\frac{-7}{21} = \frac{-7 \div 7}{21 \div 7} = \frac{-1}{3}$

H.C.F of 3 and 9 is 3 $\Rightarrow \frac{3}{-9} = \frac{3 \div 3}{-9 \div 3} = \frac{1}{-3}$.

(iv) $\frac{-8}{-14}$ and $\frac{13}{21}$.

The H.C.F of 8 and 14 is 2

$$\frac{-8}{-14} = \frac{-8 \div 2}{-14 \div 2} = \frac{-4}{-7} = \frac{4}{7}$$

The H.C.F of 13 and 21 is 1.

$$\therefore \quad \frac{13}{21} = \frac{13 \times 1}{21 \times 1} = \frac{13}{21}$$

$$\therefore \quad \frac{-8}{-14} \neq \frac{13}{21}.$$

Solution-02:-

(i) $\frac{2}{3} = \frac{5}{x}$

By cross multiplication, we get

$$\Rightarrow x = \frac{5 \times 3}{2}$$

$$\Rightarrow x = \frac{15}{2}$$

(ii) $\frac{-3}{7}$ and $\frac{x}{4}$

$$\frac{-3}{7} = \frac{x}{4}$$

$$\Rightarrow x = \frac{-3 \times 4}{7}$$

$$\Rightarrow x = \frac{-12}{7}.$$

(iii) $\frac{3}{5} = \frac{x}{-25}$

By cross Multiplication, we get

$$\frac{3}{5} = \frac{x}{-25}$$

$$\Rightarrow x = \frac{-3 \times 25}{5}$$

$$\Rightarrow x = \frac{+25}{5}.$$

$$\Rightarrow x = -5.$$

(iv) $\frac{13}{6} = \frac{-65}{x}$

$$\Rightarrow x = \frac{-65 \times 6}{13}$$

$$\Rightarrow x = \frac{-5 \times 6}{1}$$

$$\Rightarrow x = -30.$$

Solution - 03:-

(i) rational number.

(ii) standard form

(iii) standard

(iv) b + m

(v) positive, Negative

(vi) $\frac{-1}{1}$

(vii) zero

(viii) ratio.

Solution - 04:-

(i) False

(ii) True

(iii) False

(iv) True

(v) False

(vi) False

(vii) False

(viii) False

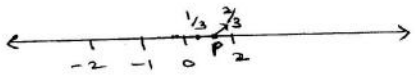
(ix) False

(x) True.

Exercise - 4.6.

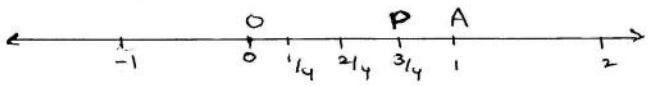
Solution - 01 :-

(i)



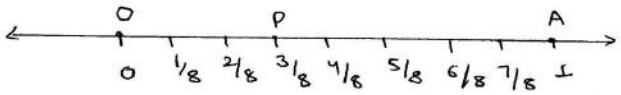
P → Represents Rational number → $\frac{2}{3}$.

(ii) $\frac{3}{4}$.



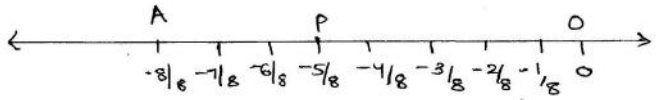
P → Represents Rational number $\frac{3}{4}$.

(iii) $\frac{3}{8}$.



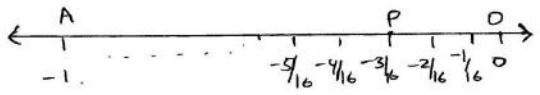
P - Represents Rational number → $\frac{3}{8}$.

(iv) $\frac{-5}{8}$.



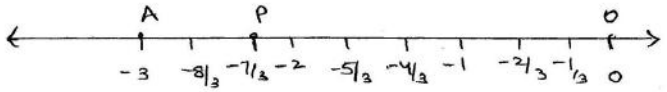
P → Represents Rational number → $\frac{-5}{8}$.

(V)



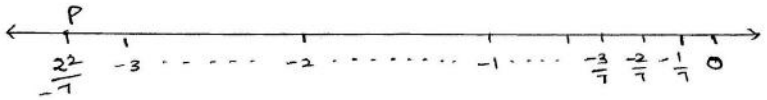
P → Repents a Rational number $-3/16$.

(VI)



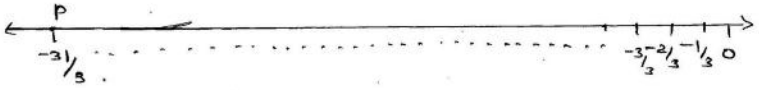
P Represents a Rational number $-7/3$

(VII)



P Represents a Rational number $\frac{22}{-7}$.

(VIII)



P → Represents Rational number $-31/3$

Solution-02:-

(i) $\frac{-3}{8}, 0$.

All negative Rational numbers are less than zero.

$\frac{-3}{8} < 0$. $\quad \therefore 0 > \frac{-3}{8}$

(ii) $\frac{5}{2}, 0$.

All positeve Rational numbers are greater than zero.

$\frac{5}{2} > 0$.

(iii) $-\frac{4}{11}, \frac{3}{11}$.

clearly, $\frac{3}{11}$ is a positive Rational number and $\frac{-4}{11}$ is a negative rational number. we know that every positive rational number is greatey than every negative rational number.

$\therefore \frac{3}{11} > \frac{-4}{11}$.

(iv) $\frac{-7}{12}, \frac{5}{-8}$

First we write each of the given rational numbers with positive denominator

clearly, denominator of $\frac{-7}{12}$ is positive.

The denominator of $\frac{5}{-8}$ is negative.

So, we express it with positive denominator as follows.

$$\frac{5}{-8} = \frac{5 \times (-1)}{-8 \times (-1)} = \frac{-5}{8}.$$

Now, LCM of denominators 12 and 8 is 24.

We write the rational numbers so that they have a common denominator 24 as follows

$$-\frac{7}{12} \times \frac{2}{2} = \frac{-14}{24} \text{ and } -\frac{5}{8} \times \frac{3}{3} = \frac{-15}{24}.$$

$-14 > -15$.

$$\therefore \frac{-14}{24} > \frac{-15}{24}$$

v) $\frac{4}{-9}, \frac{-3}{-7}$

$$\frac{4}{-9}, \frac{(-3) \times (-1)}{(-7) \times (-1)}$$

$$\frac{4}{-9}, \frac{3}{7}.$$

$\therefore$ postive rational number > negative Rational number

$$\frac{3}{7} > \frac{-4}{9}.$$

(vi) $\frac{-5}{8}, \frac{+3}{-4}$

$\frac{-5}{8}$ and $\frac{3}{-4} \times \frac{(-1)}{(-1)}$

$\frac{-5}{8}$ & $\frac{-3}{4}$

L.C.M of 4 and 8 is 8

$-\frac{3}{4} = \frac{-3\times2}{4\times2} = \frac{-6}{8}$.

$-\frac{5}{8} > \frac{-6}{8}$.

vii) $\frac{5}{9}, \frac{-3}{-8}$

$\frac{-3}{-8} = \frac{(-3)\times(-1)}{(-8)\times(-1)} = \frac{3}{8}$.

$\frac{5}{9}, \frac{3}{8}$

L.C.M of 9 and 8 is 72

$\therefore \frac{5}{9} = \frac{5\times8}{9\times8} = \frac{40}{72}$

$\frac{3}{8} = \frac{3\times9}{8\times9} = \frac{27}{72}$.

We know that, $40 > 27$

$\therefore \frac{40}{72} > \frac{27}{72}$.

(viii) $\frac{5}{-8}, \frac{-7}{12}$

$$\frac{5}{-8} = \frac{5\times(-1)}{-8\times(-1)} = \frac{-5}{8}.$$

$$\frac{-5}{+8}, \frac{-7}{12}$$

L.c.M of 8 and 12 is 24.

$$\frac{-5}{8} = \frac{-5\times3}{8\times3} = \frac{-15}{24}.$$

$$\frac{-7}{12} = \frac{-7\times2}{12\times2} = \frac{-14}{24},$$

Solution-03:-

(i) $\frac{-6}{-13}, \frac{7}{13}$

$$\frac{-6}{-13} = \frac{-6\times(-1)}{-13\times(-1)} = \frac{6}{13}.$$

$\therefore 7 > 6$

$\therefore \frac{6}{13} < \frac{7}{13}$ i.e $\frac{-6}{-13} < \frac{7}{13}$.

(ii) $\frac{16}{-5}, 3$

negtive rational number < positive rational number

$$\frac{16}{-5} < 3.$$

(iii) $\frac{-4}{3}, \frac{8}{-7}$.

$\frac{-4}{3}, \frac{-8}{7}$.

L.c.m of 3 and 7 is 21

$\frac{-4}{3} = \frac{-4\times7}{3\times7} = \frac{-28}{21}$

$\frac{-8}{7} = \frac{-8\times3}{3\times7} = \frac{-24}{21}$

$\frac{-28}{21} < \frac{-24}{21}$

$\frac{-4}{3} < \frac{-8}{7}$.

(iv) $\frac{-12}{5}, -3$.

L.c.m of 5 and 1 is 5.

$\frac{-12}{5} = \frac{-12\times5}{5\times5} = \frac{-60}{25} = \frac{-12}{5}$.

$-3 = \frac{-3\times5}{1\times5} = \frac{-15}{5}$

$\therefore \frac{-15}{5} < \frac{-12}{5}$.

Solution -04

(i) $<$

(ii) $>$

(iii) $<$

(iv) $>$

Solution - 05.

(i) $\frac{3}{5}, \frac{-17}{-30}, \frac{8}{-15}, \frac{-7}{10}$

First we write each of the followins given rational numbers with positive denominators

$\frac{3}{5}, \frac{-17}{30}, \frac{-8}{15}, \frac{-7}{10}$.

L.c.M of 5, 30, 15, 10 is 30

$\frac{3}{5} = \frac{3\times6}{5\times6} = \frac{18}{30}$

$\frac{-8}{15} = \frac{-8\times2}{15\times2} = \frac{-16}{30}$.

$\frac{-7}{10} = \frac{-7\times3}{10\times3} = \frac{-21}{30}$.

$\frac{-7}{10} < \frac{-8}{15} < \frac{-17}{30} < \frac{3}{5}$

(11) $\frac{-4}{9}, \frac{5}{-12}, \frac{7}{-18}, \frac{2}{-3}$.

First we write each one of the given rational numbers with positive denominator.

$\frac{-4}{9}, \frac{-5}{12}, \frac{-7}{18}, \frac{-2}{3}$.

L.C.M of 9, 12, 18 and 3 is

$$\begin{array}{r|l} 3 & 9, 12, 18, 3 \\ 3 & 3, 4, 6, 1 \\ 2 & 1, 4, 2, 1 \\ & 1, 2, 1, 1 \end{array}$$

$\therefore$ L.C.M $= 3 \times 3 \times 2 \times 2 = 36$.

$\therefore \frac{-4}{9} = \frac{-4 \times 4}{9 \times 4} = \frac{-16}{36}$

$\frac{-5}{12} = \frac{-5 \times 3}{12 \times 3} = \frac{-15}{36}$.

$\frac{-7}{18} = \frac{-7 \times 2}{18 \times 2} = \frac{-14}{36}$.

$\frac{-2}{3} = \frac{-2 \times 12}{3 \times 12} = \frac{-24}{36}$.

$\therefore \frac{2}{-3} < \frac{-4}{9} < \frac{5}{-12} < \frac{7}{-18}$.

solution-06.

(i) $\frac{7}{8}, \frac{64}{16}, \frac{36}{-12}, \frac{5}{-4}, \frac{140}{28}$.

First we write each one of the given rational numbers with positive denominators

$\frac{7}{8}, \frac{64}{16}, \frac{-36}{12}, \frac{-5}{4}, \frac{140}{28}$.

∴ L.C.M of 8, 16, 12, 4, 28.

$$\begin{array}{r|l} 4 & 8, 16, 12, 4, 28 \\ \hline 2 & 2, 4, 3, 1, 7 \\ \hline & 1, 2, 3, 1, 7 \end{array}$$

$$L.CM = 4 \times 2 \times 2 \times 3 \times 7$$
$$= 336.$$

$$\therefore \frac{7}{8} = \frac{7 \times 42}{8 \times 42} = \frac{294}{336}.$$

$$\frac{64}{16} = \frac{64 \times 21}{16 \times 21} = \frac{1344}{336}.$$

$$\frac{-36}{12} = \frac{-36 \times 28}{12 \times 28} = \frac{-1008}{336}.$$

$$\frac{-5}{4} = \frac{-5 \times 84}{4 \times 84} = \frac{-420}{336}$$

$$\frac{140}{28} = \frac{140 \times 12}{28 \times 12} = \frac{1680}{336}.$$

$$\frac{140}{28} > \frac{64}{16} > \frac{7}{8} > \frac{5}{-4} > \frac{36}{-12}.$$

Solution-6

(ii) $\frac{-3}{10}, \frac{17}{-30}, \frac{7}{-15}, \frac{-11}{20}$.

First we write each of the given rational numbers with positive rational number

$$\frac{-3}{10}, \frac{-17}{30}, \frac{-7}{15}, \frac{-11}{20}.$$

L.C.M of 10, 30, 15 and 20 is 60.

$$\frac{-3}{10} = \frac{-3\times6}{10\times6} = \frac{-18}{60}$$

$$\frac{17}{-30} = \frac{17\times2}{-30\times2} = \frac{-34}{60}$$

$$\frac{7}{-15} = \frac{-7\times4}{15\times4} = \frac{-28}{60}$$

$$\frac{-11}{20} = \frac{-11\times3}{20\times3} = \frac{-33}{60}$$

$$\therefore \quad \frac{-18}{60} > \frac{-28}{60} > \frac{-33}{60} > \frac{-34}{60}$$

$$\frac{-3}{10} > \frac{7}{-15} > \frac{-11}{20} > \frac{17}{-30}$$