

# Chapter 4 Rational Numbers

Exercise - 4.1.

4. Rational Numbers.

VII-class

Solution-01:-

(i)  $-7$

(ii)  $15$

(iii)  $-17$

(iv)  $8$

(v)  $5$ .

Solution-02:-

(i)  $5$

(ii)  $-34$

(iii)  $-82$

(iv)  $1$

(v) any non-zero integer.

Solution-03:-

$$\text{Numerator} = -3 \times 4 = -12$$

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

$$= 11 \times 3 = 33$$

$$\therefore \text{Required Rational number} = \frac{-12}{33}$$

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  $\rightarrow 100$ .

Largest four digit number  $\rightarrow 9999$ .

$\therefore$  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 :-

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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  $\rightarrow \frac{-5}{-7}, \frac{7}{4}, \frac{-18}{-1}, \frac{-1}{9}$ .

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

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  $\rightarrow -15$ .

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

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

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

(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,

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

(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,  $64 \div -192 = -\frac{1}{3}$ .

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,  $32 \div -192 = -\frac{1}{6}$ .

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,  $-48 \div 192 = -\frac{1}{4}$

Multiplying the Nr & Dr of  $\frac{-192}{108}$  by  $-\frac{1}{4}$

$$\frac{-192}{108} = \frac{-192 \times \frac{-1}{4}}{108 \times \frac{-1}{4}} = \frac{-48}{27}$$

solution-01

(i) clearly,  ~~$294 \div 143$~~   $14 \div -294 = \frac{-1}{21}$

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:-

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

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

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

(ii) 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  $5$ .

$$\frac{-70}{-14} = 5 \left| \frac{-70 \times 5}{-14 \times 5} = \frac{-350}{-70} \right.$$

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.

$$4 \begin{array}{l} 4, 12 \\ 1, 3 \end{array}$$

$$L.C.M = 12$$

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

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

(ii) L.C.M of 3, 6 and 12 is

$$\begin{array}{l} 3 \overline{) 3, 6, 12} \\ 2 \overline{) 1, 2, 4} \\ 1, 1, 2 \end{array}$$

$$L.C.M = 12$$

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

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

(iii) L.C.M of 7, 8, 14 and 21

$$\begin{array}{r} 7 \overline{) 7, 8, 14, 21} \\ 2 \overline{) 1, 8, 2, 3} \\ 1, 4, 1, 3 \end{array}$$

$$\begin{aligned} \text{L.C.M} &= 7 \times 2 \times 4 \times 3 \\ &= 168. \end{aligned}$$

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

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

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

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

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

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:-

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

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

$$(iii) \frac{132}{-428} = \frac{\cancel{44} 34}{-107}$$

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

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

Solution-03:-

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

Let  $\dots$  be  $x$  then

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

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

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

$$y = \frac{-5 \times 49}{7} \\ = -35$$

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

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

$$\Rightarrow x = \frac{4 \times 18}{9} \\ = 8$$

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

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

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

$$\Rightarrow y = 27$$

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

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

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

$$\Rightarrow x = 26.$$

$$ki \quad \frac{6}{-13} = \frac{24}{y}$$

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

$$\Rightarrow y = -52.$$

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

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

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

$$\Rightarrow x = -22.$$

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

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

$$\Rightarrow y = -15.$$



Exercise -4.4.

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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.

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

$$\textcircled{V} \frac{299}{-161}$$

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

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

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

$$\textcircled{VI} \frac{-63}{-210}$$

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

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

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

$$\textcircled{VII} \frac{68}{-119}$$

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

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

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

$$\textcircled{VIII} \frac{-195}{275}$$

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.

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

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

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

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

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

$$\Rightarrow x = \frac{-75}{5}$$

$$\Rightarrow x = -15.$$

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

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

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

$$\Rightarrow x = -30.$$

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

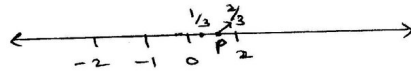
(ix) False

(x) True.

Exercise-4.6.

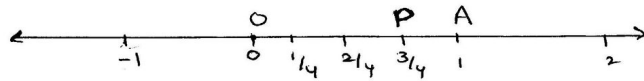
Solution - 01 :-

(i)



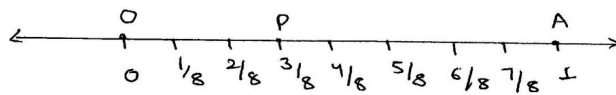
P → Represents Rational number →  $\frac{2}{3}$ .

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



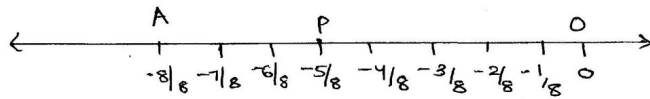
P → Represents Rational number  $\frac{3}{4}$ .

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



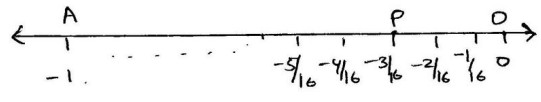
P → Represents Rational number →  $\frac{3}{8}$ .

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



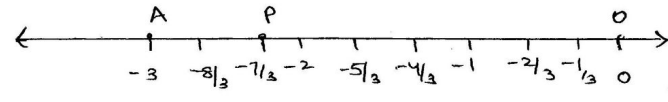
P → Represents Rational number →  $-\frac{5}{8}$ .

(V)



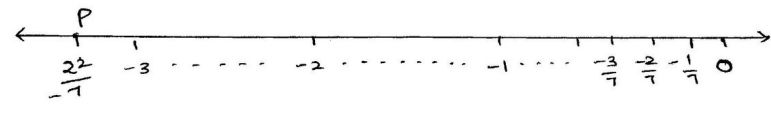
P → Represents a Rational number  $-\frac{3}{16}$ .

(VI)



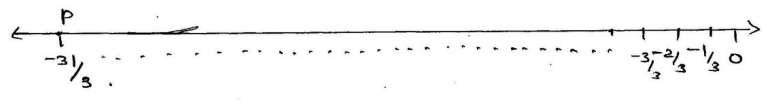
P Represents a Rational number  $-\frac{7}{3}$

(VII)



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

(VIII)



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



Solution-02:-

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

All negative Rational numbers are less than zero.

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

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

All positive 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 greater 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.

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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

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

$$-14 > -15$$

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

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

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

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

$\therefore$  positive rational number  $>$  negative Rational number

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

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

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

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

~~1/8~~ L.C.M of 4 and 8 is 8

$$\frac{-3}{4} = \frac{-3 \times 2}{4 \times 2} = \frac{-6}{8}$$

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

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

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

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

L.C.M of 9 and 8 is 72

$$\therefore \frac{5}{9} = \frac{5 \times 8}{9 \times 8} = \frac{40}{72}$$

$$\frac{3}{8} = \frac{3 \times 9}{8 \times 9} = \frac{27}{72}$$

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.

$$\frac{-5}{8} = \frac{-5 \times 3}{8 \times 3} = \frac{-15}{24}$$

$$\frac{-7}{12} = \frac{-7 \times 2}{12 \times 2} = \frac{-14}{24}$$

solution -03:-

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

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

$$\therefore 7 > 6$$

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

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

negative rational number < positive rational number

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

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

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

L.C.M of 3 and 7 is 21

$$\frac{-4}{3} = \frac{-4 \times 7}{3 \times 7} = \frac{-28}{21}$$

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

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

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

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

L.C.M of 5 and 1 is 5.

$$\frac{-12}{5} = \frac{-12 \times 5}{5 \times 5} = \frac{-60}{25} = \frac{-12}{5}$$

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

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

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 following 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

$$\frac{3}{5} = \frac{3 \times 6}{5 \times 6} = \frac{18}{30}$$

$$\frac{-8}{15} = \frac{-8 \times 2}{15 \times 2} = \frac{-16}{30}$$

$$\frac{-7}{10} = \frac{-7 \times 3}{10 \times 3} = \frac{-21}{30}$$

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

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

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

$$\begin{array}{r} 3 \overline{) 9, 12, 18, 3} \\ \underline{3, 4, 6, 1} \\ 3 \overline{) 3, 4, 6, 1} \\ \underline{1, 4, 2, 1} \\ 2 \overline{) 1, 4, 2, 1} \\ \underline{1, 2, 1, 1} \end{array}$$

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

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

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

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

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

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

solution-06.

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

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

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

$\therefore$  L.C.M of 8, 16, 12, 4, 28.

$$\begin{array}{l} 4 \overline{) 8, 16, 12, 4, 28} \\ 2 \overline{) 2, 4, 3, 1, 7} \\ \quad 1, 2, 3, 1, 7 \end{array}$$

$$\begin{aligned} \text{L.C.M} &= 4 \times 2 \times 2 \times 3 \times 7 \\ &= 336. \end{aligned}$$

$$\therefore \frac{7}{8} = \frac{7 \times 42}{8 \times 42} = \frac{284}{336}.$$

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

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

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

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

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



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.

$$-\frac{3}{10} = \frac{-3 \times 6}{10 \times 6} = -\frac{18}{60}$$

$$\frac{17}{-30} = \frac{17 \times 2}{-30 \times 2} = -\frac{34}{60}$$

$$\frac{7}{-15} = \frac{-7 \times 4}{15 \times 4} = -\frac{28}{60}$$

$$-\frac{11}{20} = \frac{-11 \times 3}{20 \times 3} = -\frac{33}{60}$$

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

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