

19/3/2020

DATE      

## chapter-1

## Rational Numbers

## Exercise 1-A

Ques  $\rightarrow$  Express  $\frac{-64}{112}$  as a rational number with denominator 7.

$$\frac{-64}{112} \xrightarrow{-16} \frac{-4}{7}$$

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

Ques  $\rightarrow$  Express  $\frac{-48}{60}$  as a rational number with denominator 25.

$$\frac{-48}{60} \xrightarrow{-4} \frac{-4}{5} = \frac{-4}{5} \times \frac{5}{5} = \frac{-20}{25}$$

Ques  $\rightarrow$  Express each of the following rational numbers in standard form:-

(i)  $\frac{-12}{30}$

$$\frac{-12}{30} \div \frac{60}{60} = \frac{-12}{30} \times \frac{60}{60} = \frac{-2}{5}$$

2	12	30
2	6	15
3	3	5
5	1	1

HCF =  $2 \times 3$   
= 6

$$\frac{-2}{5}$$

$$i) \quad \frac{15}{32} \text{ and } \frac{17}{24}$$

$$\frac{15 \times 3}{96} \text{ and } \frac{17 \times 4}{96}$$

$$\frac{15 \times 3}{32 \times 3} \text{ and } \frac{17 \times 4}{24 \times 4}$$

$$\begin{array}{r|l} 2 & 32, 24 \\ \hline 2 & 16, 12 \\ \hline 2 & 8, 6 \\ \hline 2 & 4, 3 \\ \hline 2 & 2, 3 \\ \hline 3 & 1, 3 \\ \hline & 1, 1 \end{array}$$

$$\text{LCM} = 2 \times 2 \times 2 \times 2 \times 2 \times 3 = 96$$

$$\frac{45}{96} \text{ and } \frac{68}{96}$$

$$\frac{45}{96} < \frac{68}{96}$$

$$\frac{15}{32} < \frac{17}{24}$$

$$ii) \quad \frac{10}{11} \text{ and } \frac{17}{18}$$

$$\frac{10 \times 18}{198} \text{ or } \frac{17 \times 11}{198}$$

$$\frac{10 \times 18}{11 \times 18} \text{ and } \frac{17 \times 11}{18 \times 11}$$

$$\frac{180}{198} \text{ and } \frac{187}{198}$$

$$\frac{180}{198} < \frac{187}{198}$$

$$\begin{array}{r|l} 2 & 11, 18 \\ \hline 3 & 11, 9 \\ \hline 3 & 11, 3 \\ \hline 11 & 11, 1 \\ \hline & 1, 1 \end{array}$$

$$\text{LCM} = 2 \times 3 \times 3 \times 11 = 132$$

$$\frac{10}{11} < \frac{17}{18}$$

iii.)  $\frac{-5}{12}$  and  $\frac{-3}{4}$

2	12, 4
2	6, 2
3	3, 1
	1, 1
LCM = 2 × 2 × 3	
= 12	

$$\frac{-5 \times 1}{12 \times 1} \text{ and } \frac{-3 \times 3}{4 \times 3}$$

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

$$\frac{-15}{12} > \frac{-9}{12}$$

$$\frac{-5}{12} > \frac{-3}{4}$$

iv.)  $\frac{-7}{24}$  and  $\frac{9}{-20}$

2	24, 20
2	12, 10
2	6, 5
3	3, 5
5	1, 5
	1, 1
LCM = 2 × 2 × 2 × 3 × 5	
= 120	

$$= \frac{9}{-20} \times \frac{-1}{-1} = \frac{-9}{20}$$

$$\frac{-7 \times 5}{24 \times 5} \text{ and } \frac{9 \times 6}{-20 \times 6}$$

$$\frac{-35}{120} \text{ and } \frac{-54}{-120}$$

$$\frac{-35}{120} < \frac{-54}{120}$$



$$\frac{-7}{24} < \frac{9}{-20}$$

Ques  $\rightarrow$  Arrange in ascending order :-

i)  $\frac{5}{6}, \frac{7}{9}, \frac{11}{12}, \frac{13}{18}$

2	6, 9, 12, 18
2	3, 9, 6, 9
3	3, 9, 3, 9
3	1, 3, 1, 3
	1, 1, 1, 1

The LCM of 6, 9, 12, 18 is 36.

$$\frac{5}{6} = \frac{5}{6} \times \frac{6}{6} = \frac{30}{36}$$

$$\text{LCM} = 2 \times 2 \times 3 \times 3 = 36$$

$$\frac{7}{9} = \frac{7}{9} \times \frac{4}{4} = \frac{28}{36}$$

$$\frac{11}{12} = \frac{11}{12} \times \frac{3}{3} = \frac{33}{36}$$

$$\frac{13}{18} = \frac{13}{18} \times \frac{2}{2} = \frac{26}{36}$$

$$\frac{26}{36} < \frac{28}{36} < \frac{30}{36} < \frac{33}{36}$$

$$\frac{13}{18} < \frac{7}{9} < \frac{5}{6} < \frac{11}{12}$$

ii)  $\frac{5}{-7}, \frac{-9}{14}, \frac{-5}{6}$  and  $\frac{7}{-12}$

$$\frac{5}{-7} = \frac{5}{-7} \times \frac{-1}{-1} = \frac{-5}{7} = \frac{-5}{7} \times \frac{12}{12} = \frac{-60}{84}$$



$$\frac{7}{-12} = \frac{7}{-12} \times \frac{-1}{-1} = -\frac{7}{12} = -\frac{7}{12} \times \frac{7}{7} = -\frac{49}{84}$$

$$\frac{-9}{14} = -\frac{9}{14} \times \frac{6}{6} = -\frac{54}{84}$$

$$\frac{-5}{6} = -\frac{5}{6} \times \frac{14}{14} = -\frac{70}{84}$$

$$-\frac{70}{84} < -\frac{60}{84} < -\frac{54}{84} < -\frac{49}{84}$$

$$-\frac{5}{6} < \frac{5}{-7} < -\frac{9}{14} < \frac{7}{-12}$$

iii.)  $-2, \frac{1}{3}, -\frac{13}{6}$  and  $\frac{8}{-3}$

$$= -\frac{2}{1}, \frac{1}{3}, -\frac{13}{6}$$
 and  $-\frac{8}{3}$

2	3, 6, 3
3	3, 3, 3
	1, 1, 1
	LCM = 2 x 3
	= 6

$$= -\frac{2}{1} \times \frac{6}{6}, \frac{1}{3} \times \frac{2}{2}, -\frac{13}{6} \times \frac{1}{1}$$
 and  $-\frac{8}{3} \times \frac{2}{2}$

$$= -\frac{12}{6}, \frac{2}{6}, -\frac{13}{6}$$
 and  $-\frac{16}{6}$

$$= -\frac{16}{6} < -\frac{13}{6} < -\frac{12}{6} < \frac{2}{6}$$

$$= \frac{8}{-3} < -\frac{13}{6} < -2 < \frac{1}{3}$$

$$\text{iv.) } \frac{13}{-28}, \frac{-23}{42}, \frac{-4}{7} \text{ and } \frac{-9}{14}$$

$$\frac{-13}{28}, \frac{-23}{42}, \frac{-4}{7}, \frac{-9}{14}$$

$$\frac{-13}{28} = \frac{-13}{28} \times \frac{3}{3} = \frac{-39}{84}$$

$$\frac{-23}{42} = \frac{-23}{42} \times \frac{2}{2} = \frac{-46}{84}$$

$$\frac{-4}{7} = \frac{-4}{7} \times \frac{12}{12} = \frac{-48}{84}$$

$$\frac{-9}{14} = \frac{-9}{14} \times \frac{6}{6} = \frac{-54}{84}$$

$$\frac{-54}{84} < \frac{-48}{84} < \frac{-46}{84} < \frac{-39}{84}$$

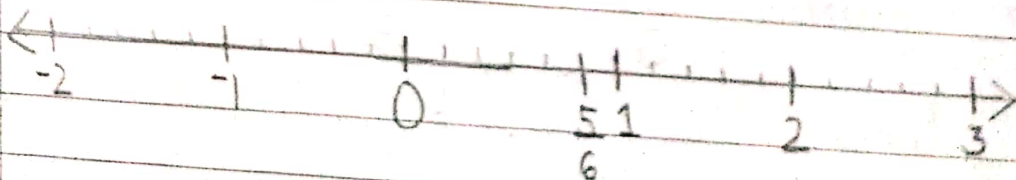
$$\frac{-9}{14} < \frac{-4}{7} < \frac{-23}{42} < \frac{13}{-28}$$

2	28	42	7	14
2	14	21	7	7
3	7	21	7	7
7	7	7	7	7
	1	1	1	1

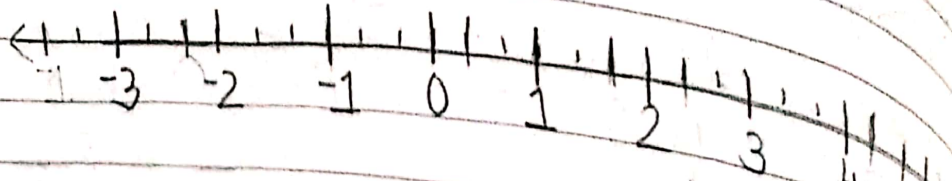
$$\text{LCM} = 2 \times 2 \times 3 \times 7 = 84$$

Ques → Represent each of the following numbers on the number line:-

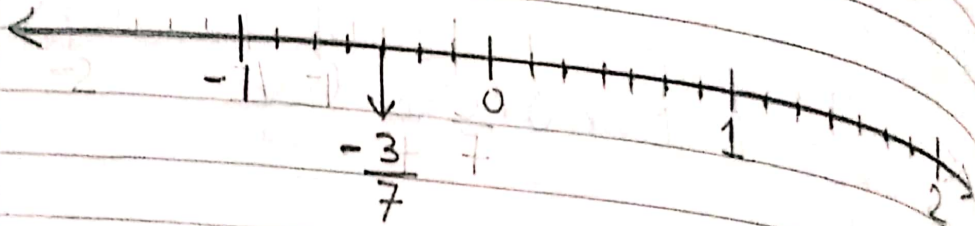
$$\text{i.) } \frac{5}{6}$$



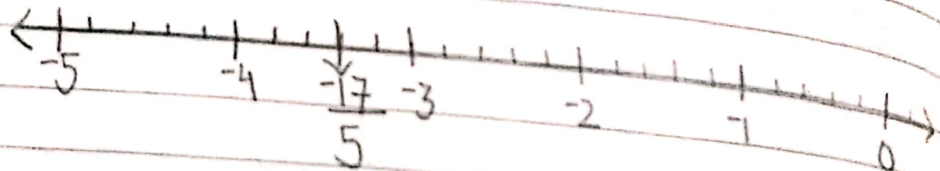
ii.)  $\frac{14}{3} = 4\frac{2}{3}$



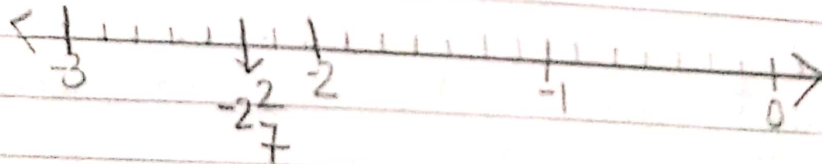
iii.)  $-\frac{3}{7}$



iv.)  $-\frac{17}{5} = -\left[3\frac{2}{5}\right]$

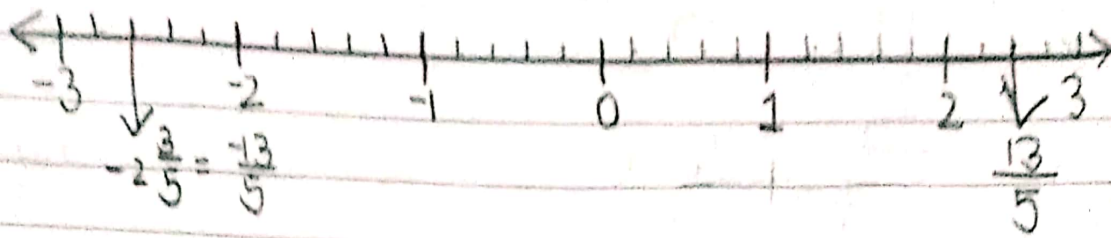


v.)  $-\left[2\frac{2}{7}\right]$



Ques → Represent  $\frac{13}{5}$  and  $-\frac{13}{5}$  on the number line.





## Exercise 1-B

Ques-1 Find the additive inverse of:

i.)  $\frac{9}{13} = -\frac{9}{13}$

ii.)  $\frac{16}{7} = -\frac{16}{7}$

iii.)  $\frac{-3}{23} = \frac{3}{23}$

iv.)  $\frac{8}{-11} = \frac{8}{11}$

v.)  $\frac{-22}{15} = \frac{22}{15}$

vi.)  $\frac{-11}{-9} = \frac{-11}{9}$

Ques-2 Find the Sum:

$$i) \frac{-7}{17} + \frac{6}{17}$$

$$\frac{-7}{17} + \frac{6}{17}$$

$$\frac{(-7)+6}{17} = \frac{-1}{17}$$

$$ii) \frac{-5}{12} + \frac{7}{-12}$$

$$\frac{7}{-12} = \frac{7}{-12} \times \frac{-1}{-1}$$

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

$$= \frac{(-5)+(-7)}{12} = \frac{-12}{12} = -1$$

$$iii) \frac{8}{15} + \frac{5}{12}$$

$$\frac{8 \times 4 + 5 \times 5}{60}$$

$$\frac{32+25}{60} = \frac{57}{60}$$

2	15, 12
2	15, 6
3	15, 3
5	5, 1
1	1

LCM = 2 x 2 x 3 x 5  
= 60

$$iv) \frac{-11}{18} + \frac{5}{-12}$$

$$\frac{5}{-12} = \frac{5}{-12} \times \frac{-1}{-1} = \frac{-5}{12}$$

$$\frac{-11 \times 2 + (-5 \times 3)}{36}$$

$$\frac{-22 + (-15)}{36} = \frac{-37}{36} = -1\frac{1}{36}$$

2	18, 12
2	9, 6
3	9, 3
3	3, 1
	1, 1

LCM =  $2 \times 2 \times 3$   
= 36

$$v.) \quad \frac{-11}{6} + \frac{-3}{4} + \frac{5}{8} + \frac{-7}{3}$$

$$\frac{-11 \times 4 + (-3 \times 6) + 5 \times 3 + (-7 \times 8)}{24}$$

$$\frac{-44 + (-18) + 15 + (-56)}{24}$$

$$\frac{-103}{24} = -4\frac{7}{24}$$

2	6, 4, 8, 3
2	3, 2, 4
2	3, 1, 2
3	3, 1, 1
	1, 1, 1

LCM =  $2 \times 2 \times 3$   
= 24

$$vi.) \quad \frac{4}{7} + \frac{2}{-3} + \frac{5}{21} + \frac{-8}{9}$$

$$\frac{2}{-3} = \frac{2}{-3} \times \frac{-1}{-1} = \frac{-2}{3}$$

$$\frac{4 \times 9 + (-2 \times 21) + 5 \times 3 + (-8 \times 7)}{63}$$

$$\frac{36 + (-42) + 15 + (-56)}{63} = \frac{-47}{63}$$

3	7, 3, 21, 9
3	7, 1, 7
7	7, 1, 7
	1, 1, 1

LCM = 63



Ques → Subtract :-

i)  $\frac{2}{3}$  from  $\frac{5}{6}$

2 | 3, 6  
3 | 3, 2  
1, 1  
LCM = 6

$$\frac{5}{6} - \frac{2}{3}$$

$$\frac{5 - 2 \times 2}{6} = \frac{5 - 4}{6} = \frac{1}{6}$$

ii.)  $\frac{-2}{5}$  from  $\frac{-5}{7}$

$$\frac{-5}{7} - \left[ \frac{-2}{5} \right]$$

$$\frac{-5 \times 5 - (-2 \times 7)}{35}$$

$$\frac{-25 - (-14)}{35} = \frac{-25 + 14}{35} = \frac{-11}{35}$$

iii.)  $\frac{4}{9}$  from  $\frac{-7}{8}$

2 | 9, 8  
2 | 9, 4  
2 | 9, 2  
3 | 9, 1  
3 | 3, 1  
1, 1  
LCM = 72

$$\frac{-7}{8} - \frac{4}{9}$$

$$\frac{-7 \times 9 - 4 \times 8}{72}$$

$$\frac{-63-32}{72}$$

$$\frac{-95}{72} = -1 \frac{23}{72}$$

iv.)  $\frac{-11}{6}$  from  $\frac{8}{3}$

$$\frac{8}{3} - \left[ \frac{-11}{6} \right]$$

$$\frac{8 \times 2 - (-11 \times 1)}{6}$$

$$\frac{16 - (-11)}{6} = \frac{16 + 11}{6} = \frac{27}{6} = \frac{9}{2} = 4 \frac{1}{2}$$

Ques  $\rightarrow$  The sum of two rational numbers is  $-\frac{4}{9}$ . If one of them is  $\frac{13}{6}$ , then, find the other.

Let other number be  $x$ .

$$x + \frac{13}{6} = -\frac{4}{9}$$

$$x = -\frac{4}{9} - \frac{13}{6}$$

$$x = \frac{-4 \times 2 - 13 \times 3}{18}$$

$$\begin{array}{r} 2 \overline{) 96} \\ 3 \overline{) 93} \\ 3 \overline{) 31} \\ 1 \overline{) 1} \\ \text{LCM} = 18 \end{array}$$

$$x = \frac{-8-39}{8}$$

$$x = \frac{-47}{18} = -2 \frac{11}{18}$$

$$x = -2 \frac{11}{18}$$

Ques → what number should be added to  $-2 \frac{2}{3}$  get  $-\frac{1}{7}$ ?

Let the required number to be added be  $x$ .

$$\text{Then, } -\frac{2}{3} + x = -\frac{1}{7}$$

$$x = \frac{4}{6} - \frac{1}{7} + \frac{2}{3}$$

$$x = \left[ \frac{-1}{7} + \frac{2}{3} \right]$$

$$x = \frac{-1 \times 3 + 2 \times 7}{21}$$

$$x = \frac{-3 + 14}{21}$$

$$x = \frac{11}{21}$$

$$\begin{array}{r|l} 3 & 7, 3 \\ 7 & 7, 1 \\ \hline & 1, 1 \end{array}$$
  
 LCM = 21



Hence, the required number is  $\frac{11}{21}$ .

Ques) What number should be subtracted from  $-2$  to get  $\frac{7}{11}$ ?

Let the required number be  $x$ . Then,

$$-2 - x = \frac{7}{11}$$

$$-2 = x + \frac{7}{11}$$

$$-2 - \frac{7}{11} = x$$

$$x = -\frac{7}{11} - \frac{2}{1}$$

$$= \frac{-7 \times 1 - 2 \times 11}{11}$$

$$= \frac{-7 - 22}{11} = \frac{-29}{11} = -2 \frac{7}{11}$$

Hence the required number is  $-2 \frac{7}{11}$ .

Ques) What number should be added to  $-1$  so as to get  $\frac{5}{7}$ ?

Let the required number to be added be  $x$ . Then,

$$-1 + x = \frac{5}{7}$$

$$x = \frac{5}{7} + 1$$

$$x = \frac{5 \times 1 + 1 \times 7}{7}$$

$$x = \frac{5 + 7}{7}$$

$$x = \frac{11}{7}$$

Hence, the required number is  $\frac{11}{7}$ .

Ques) what number should be added to  $-1$  or subtracted from  $\frac{-2}{3}$  to get  $\frac{-1}{6}$ ?

Let the required number be  $x$ , then,

$$-1 - \frac{2}{3} - x = \frac{-1}{6}$$

$$-x = \frac{-1}{6} + \frac{2}{3}$$

$$-x = \frac{-1 \times 1 + 2 \times 2}{6}$$

$$\begin{array}{r|l} 2 & 6, 3 \\ \hline 3 & 3, 3 \\ \hline & 1 \\ \hline & \text{LCM} = 6 \end{array}$$

$$-x = \frac{\cancel{+12} - 1 + \cancel{24}}{6}$$

$$-x = \frac{\cancel{24} - 1}{\cancel{6} 2}$$

$$\Rightarrow x = \frac{1}{2} \Rightarrow x = -\frac{1}{2}$$

Hence, the required number is  $-\frac{1}{2}$ .

### Exercise 1-C

Ques) Find the products:-

i)  $\frac{4}{9} \times \frac{7}{12}$

$$\frac{4}{9} \times \frac{7}{12} = \frac{7 \times 1}{9 \times 3} = \frac{7}{27}$$

i)  $\frac{7}{27}$

ii)  $-\frac{9}{18} \times \frac{7}{18}$

$$-\frac{9}{18} \times \frac{7}{18} = \frac{-1 \times 7}{1 \times 2} = -\frac{7}{2}$$

ii)  $-\frac{7}{2}$



iii.)  $\frac{-3}{16} \times \frac{8}{-15}$

$$\frac{-3^{-1} \times 8^1}{16^2 \cdot -15^{-5}} = \frac{-1 \times 1}{2 \times -5} = \frac{+1}{+10} = \frac{1}{10}$$

iii.)  $= \frac{1}{10}$

iv.)  $\frac{6}{7} \times \frac{-21}{12}$

$$\frac{6^1 \times -21^{-3}}{7^1 \cdot 12^2} = \frac{1 \times -3}{1 \times 2} = \frac{-3}{2}$$

iv.)  $= \frac{-3}{2}$

v.)  $\frac{5}{-18} \times \frac{-9}{20}$

$$\frac{5^1 \times -9^{-1}}{-18^{-2} \cdot 20^4} = \frac{1 \times +1}{-2 \times 4} = \frac{+1}{+8} = \frac{1}{8}$$

v.)  $= \frac{1}{8}$

vi.)  $\frac{-13}{15} \times \frac{-25}{26}$

$$\frac{-13^{-1}}{15^3} \times \frac{-25^{-5}}{26^2} = \frac{-1 \times (-5)}{3 \times 2} = \frac{5}{6}$$

$$\text{vi.) } = \frac{5}{6}$$

$$\text{vii.) } \frac{7}{24} \times (-48)$$

$$\frac{7}{24} \times \left( \frac{-48}{1} \right)^{-2} = \frac{7 \times (-2)}{1 \times 1} = \frac{-14}{1} = -14$$

$$\text{vii.) } -14$$

$$\text{viii.) } \frac{-13}{5} \times (-10)$$

$$\frac{-13}{5} \times \left( \frac{-10}{1} \right)^{-2} = \frac{-13 \times (-2)}{1 \times 1} = \frac{26}{1} = 26$$

$$\text{viii.) } = 26$$

Ques? Find the multiplicative inverse (or reciprocal) of:-

$$\text{i.) } \frac{-17}{12} = \frac{-12}{17}$$

$$\text{ii.) } \frac{1}{16} = -16 = \frac{-1}{16}$$

$$\text{iii.) } \frac{0}{2} = \frac{2}{0} = 2$$

$$iv.) \frac{-3}{-5} = \frac{+5}{+3} = \frac{5}{3}$$

$$v.) \frac{2}{-5} = \frac{5}{-2}$$

Ans → Find the Quotient:-

$$i.) \frac{17}{8} \div \frac{51}{4}$$

$$\frac{\cancel{17}^1}{8 \times 2} \times \frac{\cancel{4}^1}{\cancel{51}^3} = \frac{1 \times 1}{2 \times 3} = \frac{1}{6}$$

$$i.) \frac{1}{6}$$

$$ii.) \frac{-16}{35} \div \frac{15}{14}$$

$$\frac{-16}{5 \times 7} \times \frac{\cancel{14}^2}{15} = \frac{-16 \times 2}{15 \times 5} = \frac{-32}{75}$$

$$ii.) \frac{-32}{75}$$

$$iii.) \frac{-12}{7} \div (-16)$$

$$\frac{-12}{7} \times \frac{1}{\cancel{-16}^{-4}} = \frac{-3 \times 1}{7 \times (-4)} = \frac{+3}{28} = \frac{3}{28}$$

$$iii.) \frac{3}{28}$$



$$\text{iv.) } -9 \div \left[ \frac{-5}{18} \right]$$

$$\frac{-9}{1} \times \frac{18}{-5} = \frac{-9 \times 18}{1 \times (-5)} = \frac{+162}{+5} = \frac{162}{5}$$

$$\text{iv.) } \frac{162}{5}$$

Ques → Name the property of multiplication illustrated by each of the following statements :-

$$\text{i.) } \frac{-8}{9} \times \frac{-13}{7} = \frac{-13}{7} \times \frac{-8}{9}$$

Commutative Law

$$\text{ii.) } \left[ \frac{-3}{4} \times \frac{5}{7} \right] \times \frac{-9}{11} = \frac{-3}{4} \times \left[ \frac{5}{7} \times \frac{-9}{11} \right]$$

ii.) Associative Law

$$\text{iii.) } \frac{-2}{3} \times \left[ \frac{-5}{6} + \frac{7}{8} \right] = \left[ \frac{-2}{3} \times \frac{-5}{6} \right] + \left[ \frac{-2}{3} \times \frac{7}{8} \right]$$

Distributive Law of Multiplication over Addition

$$\text{iv.) } \frac{-18}{7} \times 1 = 1 \times \frac{-18}{7} = \frac{-18}{7}$$

Existence of Multiplicative Identity

$$v) \frac{-13}{17} \times \frac{17}{-13} = \frac{17}{-13} \times \frac{-13}{17} = 1$$

v) Existence of multiplicative inverse

$$vi) \frac{-9}{7} \times 0 = 0$$

Multiplicative property of zero

Ques) Verify whether the given statement is true or false:-

$$i) \frac{-8}{9} \div \frac{-4}{3} = \frac{-4}{3} \div \frac{-8}{9}$$

LHS

$$\frac{-8}{9} \div \frac{-4}{3}$$

$$\frac{-8^{-1}}{9^3} \times \frac{-3^{-1}}{4^1} = \frac{-2 \times -1}{3 \times 1} = \frac{2}{3}$$

RHS

$$\frac{-4}{3} \div \frac{-8}{9}$$

$$\frac{-4^{-1}}{3^1} \times \frac{-9^{-1}}{8^2} = \frac{-1 \times -3}{1 \times 2} = \frac{3}{2}$$

LHS  $\neq$  RHS

$$\frac{2}{3} \neq \frac{3}{2}$$

$$\frac{-8}{9} \div \frac{-4}{3} \neq \frac{-4}{3} \div \frac{-8}{9}$$

The given statement is false.

$$1.) \frac{-7}{24} \div \frac{3}{-16} = \frac{3}{-16} \div \frac{-7}{24}$$

LHS

$$\frac{-7}{24} \div \frac{3}{-16}$$

$$\frac{-7}{24} \times \frac{-16}{3} = \frac{-7 \times (-16)}{8 \times 3}$$

$$\frac{-7}{24} \times \frac{-16}{3} = \frac{-7 \times (-2)}{3 \times 3} = \frac{14}{9}$$

RHS

$$\frac{3}{-16} \div \frac{-7}{24}$$

$$\frac{3}{-16} \times \frac{-24}{7} = \frac{3 \times 3}{-2 \times 7} = \frac{9}{-14}$$



LHS  $\neq$  RHS

$$\frac{-7}{24} \div \frac{3}{-16} \neq \frac{3}{-16} \div \frac{-7}{24}$$

The given statement is false.

iii.)  $\left[ \frac{-3}{5} \div \frac{-12}{35} \right] \div \frac{1}{4} = \frac{-3}{5} \div \left[ \frac{-12}{35} \div \frac{1}{4} \right]$

LHS

$$\left[ \frac{-3}{5} \div \frac{-12}{35} \right] \div \frac{1}{4}$$

$$\left[ \frac{-3}{5} \times \frac{35}{-12} \right] \div \frac{1}{4}$$

$$\frac{7}{-4} \left[ \frac{-1 \times 7}{1 \times (-4)} \right] \div \frac{1}{4}$$

$$\frac{7}{-4} \div \frac{1}{4}$$

$$\frac{7}{-4} \times \frac{4}{1}$$

$$\frac{7}{1} = 7$$

RHS

RHS

$$\frac{-3}{5} \div \left[ \frac{-12}{35} \div \frac{1}{4} \right]$$

$$\frac{-3}{5} \div \left[ \frac{-12}{35} \times \frac{4}{1} \right]$$

$$\frac{-3}{5} \div \left[ \frac{-12 \times 4}{35 \times 1} \right]$$

$$\frac{-3}{5} \div \frac{-48}{35}$$

$$\frac{-3}{5} \times \frac{35}{-48} = \frac{7}{-16}$$

$$\frac{-1 \times 7}{1 \times (-16)}$$

$$\frac{-7}{-16}$$

LHS  $\neq$  RHS

$$\left[ \frac{-3}{5} \div \frac{-12}{35} \right] \div \frac{1}{4} \neq \frac{-3}{5} \div \left[ \frac{-12}{35} \div \frac{1}{4} \right]$$

The given statement is false.

Ques? The product of two rational numbers is  $-\frac{7}{11}$ . If one of the numbers is  $-\frac{8}{11}$ , find the other.

Let the other number be  $x$ . Then,

$$x \times \frac{-8}{11} = -7$$

$$\Rightarrow x = -7 \div \frac{-8}{11} = -7 \times \frac{11}{-8} = \frac{(-7) \times 11}{1 \times (-8)}$$

$$\Rightarrow x = \frac{-(-7 \times 11)}{-(-1 \times 8)} = \frac{+77}{+8} = \frac{77}{8} = 9\frac{5}{8}$$

Hence, the required number is  $\frac{77}{8}$ .

Ques) The product of two rational numbers is  $-16$ . If one of the numbers is  $-\frac{4}{3}$ , find the other.

Let the other number be  $x$ ; Then,

$$x \times \frac{-4}{3} = -16$$

$$\Rightarrow x = -16 \div \frac{-4}{3} = \frac{-16}{3} \times \frac{3}{-4} = \frac{(-4) \times 1}{3 \times (-1)}$$

$$\Rightarrow x = \frac{-(-4 \times 1)}{-(-3 \times 1)} = \frac{+4}{+3} = \frac{4}{3} = 1\frac{1}{3}$$

Hence, the required number is  $\frac{4}{3}$ .



Ques) By what rational number must  $\frac{1}{26}$  be divided to get  $-\frac{8}{39}$ ?

Let the other number be  $x$ . Then,

$$\frac{1}{26} \div x = -\frac{8}{39}$$

$$\frac{1}{26} \times \frac{1}{x} = -\frac{8}{39}$$

$$x = \frac{-8}{3 \cdot 39} \times \frac{26 \cdot 2}{1} \Rightarrow x = \frac{-8 \times 2}{3 \times 1} = -\frac{16}{3}$$

$$x = -\frac{16}{3}$$

Hence, the required number is  $-\frac{16}{3}$ .

Ques) Divide the sum of  $\frac{13}{5}$  and  $-\frac{12}{7}$  by the product of  $-\frac{31}{7}$  and  $\frac{1}{-2} \cdot 5$

Sum of  $\frac{13}{5}$  and  $-\frac{12}{7}$

$$\frac{13}{5} + \frac{-12}{7}$$

$$\frac{13 \times 7 + (-12) \times 5}{35}$$

$$\begin{array}{r} 5 \overline{) 5, 7} \\ 7 \overline{) 4, 7} \\ 1, 1 \\ \hline 101-35 \end{array}$$

$$\frac{91 + (-60)}{35}$$

$$= \frac{31}{35}$$

Product of  $-\frac{31}{7}$  and  $\frac{1}{-2}$

$$\frac{1}{-2} = \frac{1}{-2} \times \frac{-1}{-1} = \frac{-1}{2}$$

$$-\frac{31}{7} \times \frac{-1}{2}$$

$$\frac{-31 \times (-1)}{7 \times 2} = \frac{31}{14}$$

$$\frac{31}{35} \div \frac{31}{14}$$

$$\frac{\cancel{31}1}{355} \times \frac{14}{\cancel{31}} \Rightarrow \frac{1 \times 2}{5 \times 1} = \frac{2}{5}$$

Ans  $\Rightarrow \frac{2}{5}$

Ques-11 Divide the sum of  $\frac{65}{12}$  and  $\frac{8}{3}$  by their difference:

$$\text{Sum of } \frac{65}{12} \text{ and } \frac{8}{3}$$

$$\frac{65 \times 1 + 8 \times 4}{12}$$

$$\frac{65 + 32}{12} = \frac{97}{12}$$

$$\frac{65}{12} - \frac{8}{3}$$

$$\frac{65 \times 1 - 8 \times 4}{12}$$

$$\frac{65 - 32}{12} = \frac{33}{12}$$

$$\frac{97}{12} \div \frac{33}{12}$$

$$\frac{97}{12} \times \frac{12}{33}$$

$$\text{Ans} \rightarrow = \frac{97}{33}$$

Ques 12 Find the cost of  $3\frac{2}{5}$  metres of cloth at  $\text{₹}63\frac{3}{4}$  per metre.

Rate of cloth =  $\text{₹}63\frac{3}{4}$  per metre

$$\text{Cost of } 3\frac{2}{5} \text{ metres of cloth} = \text{₹}63\frac{3}{4} \times 3\frac{2}{5}$$



$$\frac{65 \times 1 + 8 \times 4}{12}$$

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

$$\frac{65 + 32}{12} = \frac{97}{12}$$

$$\frac{65}{12} - \frac{8}{3}$$

$$\frac{65 \times 1 - 8 \times 4}{12}$$

$$\frac{65 - 32}{12} = \frac{33}{12}$$

$$\frac{97}{12} \div \frac{33}{12}$$

$$\frac{97}{12} \times \frac{12}{33}$$

$$\text{Ans} \rightarrow = \frac{97}{33}$$

Ques 12 Find the Cost of  $3\frac{2}{5}$  metres of cloth at  $\text{₹} 63\frac{3}{4}$  per metre.

Rate of cloth =  $\text{₹} 63\frac{3}{4}$  per metre

$$\text{Cost of } 3\frac{2}{5} \text{ metres of cloth} = \text{₹} 63\frac{3}{4} \times 3\frac{2}{5}$$



Ques 14 Find the area of a rectangular part square plot of land whose each side measures  $8\frac{1}{2}$  metres.

$$\text{Side of square plot} = 8\frac{1}{2} \text{ m}$$

$$\text{Area of square} = \text{Side} \times \text{Side}$$

$$= 8\frac{1}{2} \times 8\frac{1}{2}$$

$$= \frac{17}{2} \times \frac{17}{2}$$

$$= \frac{289}{4} = 72\frac{1}{4} \text{ m}^2$$

$72\frac{1}{4} \text{ m}^2$  is the area of a square plot of land whose each side measures  $8\frac{1}{2} \text{ m}$ .

Ques 15 A Cord of length  $71\frac{1}{2}$  has been cut into 26 pieces of equal length. what is the length of each piece?

$$\text{Length of Cord} = 71\frac{1}{2} \text{ m}$$

$$\text{No of pieces cut off} = 26$$



DATE:

$$\text{length of each piece} = 71\frac{1}{2} \div 26$$

$$= \frac{143}{2} \div 26$$

$$= \frac{143}{2} \times \frac{1}{26}$$

$$= \frac{11 \times 1}{2 \times 2} = \frac{11}{4}$$

$$= \frac{11}{4} = 2\frac{3}{4} \text{ m}$$

Ans)  $2\frac{3}{4} \text{ m}$

Ques) The area of a room is  $65\frac{1}{4}$  sq. metres. If its 16 breadth is  $5\frac{1}{16}$  metres, <sup>4</sup> what is its length?

$$\text{Area of room} = 65\frac{1}{4} \text{ m}^2$$

$$\text{Breadth of room} = 5\frac{1}{16} \text{ m}$$

$$\text{length of room} = ?$$

$$\begin{aligned} \text{Area of rectangular room} &= l \times B \\ 65\frac{1}{4} \text{ m}^2 &= l \times 5\frac{1}{16} \text{ m} \end{aligned}$$

$$= \frac{21}{16} = \frac{21 \times 4}{16 \times 4} = \frac{21 \times 4}{4 \times 4} = \frac{21}{4}$$

$$= \frac{21 \times 4}{4 \times 4} = \frac{84}{16}$$

$$= \frac{49 \times 4}{1 \times 4} = \frac{116}{4} = 12 \frac{2}{4} \text{ m}$$

Ans.) Length of room =  $12 \frac{2}{4} \text{ m}$

### Exercise 1-D

Ques. 21) Find a rational number between each of the following pairs of rational numbers -

i)  $\frac{7}{10}$  and  $\frac{10}{17}$

$$\begin{array}{r} 2 \mid 10, 17 \\ 5 \mid 5, 17 \\ 17 \mid 1, 17 \\ \hline \vee \\ \text{LCM} = 170 \end{array}$$

$$\frac{1}{2} \left[ \frac{7}{10} + \frac{10}{17} \right]$$

$$= \frac{1}{2} \left[ \frac{7 \times 17 + 10 \times 10}{170} \right]$$

$$= \frac{1}{2} \left[ \frac{119 + 100}{170} \right]$$

$$= \frac{1}{2} \times \frac{219}{170} \Rightarrow \frac{219 \times 1}{2 \times 170} \Rightarrow \frac{219}{340}$$

Ans.  $\frac{219}{340}$





$$\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$$

$$\frac{1}{3} \times \frac{1}{4} = \frac{1}{12}$$

$$\frac{1}{4} \times \frac{1}{5} = \frac{1}{20}$$

$$\frac{1}{5} \times \frac{1}{6} = \frac{1}{30}$$

$$\frac{1}{6} \times \frac{1}{7} = \frac{1}{42}$$

$$\frac{1}{7} \times \frac{1}{8} = \frac{1}{56}$$

$$\frac{1}{8} \times \frac{1}{9} = \frac{1}{72}$$

Find three rational numbers between:-

1) 1 and  $\frac{1}{2}$

$$1 > \frac{1}{2} \Rightarrow \frac{2}{2} > \frac{1}{2} \Rightarrow \frac{2}{2} \times \frac{3}{3} = \frac{6}{6}$$

$$\frac{6}{6} > \frac{1}{2} \Rightarrow \frac{6}{6} \times \frac{2}{2} = \frac{12}{12}$$

$$\frac{214^4}{61} > \frac{225}{6} > \frac{210}{3} > \frac{22^4}{62} > \frac{22^4}{62} > \frac{22^4}{62} > \frac{22^4}{62}$$

$$4 > \frac{25}{6} > \frac{25}{3} > \frac{9}{2} > \frac{14}{3}$$

ii)  $-\frac{1}{2}$  and  $-\frac{91}{4}$

$$-\frac{1}{2} \times \frac{4}{4} = -\frac{2}{8} \times \frac{2}{2} = -\frac{8}{16}$$

$$-\frac{91}{4} = -\frac{1}{4} \times \frac{91}{4} = -\frac{91}{16}$$

$$-\frac{5}{16} > -\frac{1}{16} > -\frac{7}{16}$$

$$-\frac{5}{16} > -\frac{3}{8} > -\frac{7}{16}$$

iii) 2 and 3

$$2 \times \frac{4}{4} = \frac{8}{4}$$

$$\frac{3}{1} \times \frac{4}{4} = \frac{12}{4}$$

$$\frac{9}{4} < \frac{9}{4} < \frac{10}{4} < \frac{11}{4} < \frac{12}{4}$$

$$\frac{9}{4} < \frac{5}{4} < \frac{11}{4} < \frac{12}{4}$$

$$\frac{24}{61} > \frac{25}{6} > \frac{26}{203} > \frac{27}{62} > \frac{28}{63}$$

$$4 > \frac{25}{6} > \frac{26}{3} > \frac{9}{2} > \frac{14}{3}$$

ii)  $\frac{-1}{2}$  and  $\frac{-1}{4}$

$$\frac{-1}{2} \times \frac{4}{4} = \frac{-4}{8} \times \frac{2}{2} = \frac{-8}{16}$$

$$\frac{-1}{4} = \frac{-1}{4} \times \frac{4}{4} = \frac{-4}{16}$$

$$\frac{-5}{16} > \frac{-6}{16} > \frac{-7}{16}$$

$$\frac{-5}{16} > \frac{-3}{8} > \frac{-7}{16}$$

iii) 2 and 3

$$\frac{2}{1} \times \frac{4}{4} = \frac{8}{4}$$

$$\frac{3}{1} \times \frac{4}{4} = \frac{12}{4}$$

$$\frac{9}{4} < \frac{5}{2} < \frac{11}{4} < \frac{13}{4}$$

$$\frac{9}{4} < \frac{5}{2} < \frac{11}{4} < \frac{13}{4}$$



Three rational numbers are-

$$\frac{9}{4} < \frac{5}{2} < \frac{11}{4}$$

Ques-3 five five rational numbers between:-

i)  $\frac{3}{5}$  and  $\frac{2}{3}$

$$\frac{3}{5} = \frac{3}{5} \times \frac{3}{3} = \frac{9}{15} \times \frac{8}{8} = \frac{72}{120}$$

$$\frac{2}{3} = \frac{2}{3} \times \frac{5}{5} = \frac{10}{15} \times \frac{8}{8} = \frac{80}{120}$$

$$\frac{73}{120} < \frac{74}{120} < \frac{75}{120} < \frac{76}{120} < \frac{77}{120}$$

ii.)  $-2$  and  $-1\frac{1}{2}$

$$-2 = \frac{-2}{1} \times \frac{2}{2} = \frac{-4}{2} \times \frac{10}{10} = \frac{-40}{20}$$

~~$$-1\frac{1}{2}$$~~

$$-1\frac{1}{2} = \frac{-3}{2} \times \frac{10}{10} = \frac{-30}{20}$$

$$\frac{-39}{20} < \frac{-38}{20} < \frac{-37}{20} < \frac{-36}{20} < \frac{-35}{20}$$

iii)  $-3$  and  $-2$

$$-3 = \frac{-3}{1} \times \frac{10}{10} = \frac{-30}{10}$$

$$-2 = \frac{-2}{1} \times \frac{10}{10} = \frac{-20}{10}$$

$$\frac{-29}{10} < \frac{-28}{10} < \frac{-27}{10} < \frac{-26}{10} < \frac{-25}{10}$$

Ques- find 10 rational numbers between  $-\frac{3}{4}$  and  $\frac{5}{6}$

4

$$-\frac{3}{4} \text{ and } \frac{5}{6}$$

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

$$\frac{5}{6} \times \frac{2}{2} = \frac{10}{12}$$

$$\frac{-8}{12} < \frac{-7}{12} < \frac{-6}{12} < \frac{-5}{12} < \frac{-4}{12} < \frac{-3}{12} < \frac{-2}{12} < \frac{-1}{12} < 0 < \frac{1}{12}$$

Ques- find 12 rational numbers between -1 and 2

5

$$-1 = \frac{-1}{1} \times \frac{10}{10} = \frac{-10}{10}$$

$$2 = \frac{2}{1} \times \frac{10}{10} = \frac{20}{10}$$

$$\frac{9}{10} < \frac{8}{10} < \frac{7}{10} < \frac{6}{10} < \frac{5}{10} < \frac{4}{10} < \frac{3}{10} < \frac{2}{10}$$

$$< \frac{1}{10} < 0 < \frac{1}{10} < \frac{2}{10}$$

### Assignment - 1

Ques 1 Circle the numbers which are not rational:-

$$\frac{1}{2}, \left(\frac{5}{0}\right), (0), (1), -\frac{7}{5}, (12), \frac{15}{2}, \left(\frac{7}{0}\right), \left(\frac{6}{1}\right)$$

Ques 2 write the additive inverse of the following rational numbers:-

i)  $\frac{5}{7} = -\frac{5}{7}$

ii)  $\frac{2}{3} = -\frac{2}{3}$

iii)  $-\frac{5}{8} = \frac{5}{8}$

iv)  $0 = 0$

v)  $\frac{18}{19} = -\frac{18}{19}$

Ques 3 write the multiplicative inverse of the following rational numbers:-





DATE

$$x = \frac{-3 + 10}{3}$$

$$x = \frac{-3 \times 3 + 10 \times 1}{3}$$

$$x = \frac{-9 + 10}{3}$$

$$x = \frac{1}{3}$$

Hence, the required number is  $\frac{1}{3}$ .

## Exercise 1-D E

## Multiple choice Questions:-

Q-1 A number of the form  $\frac{p}{q}$  is said to be a rational number if

a)  $p$  and  $q$  are whole numbers and  $q \neq 0$ .

Q-2 The additive inverse of  $-\frac{5}{12}$  is  $\frac{5}{12}$

$$2) \quad \frac{-5}{12} + \frac{5}{12} = \frac{-5+5}{12} = \frac{0}{12} = 0$$

Ques 3 The multiplicative inverse of  $-\frac{5}{12}$  is  $-\frac{12}{5}$

$$3) \quad \frac{-5}{12}^{-1} \times \frac{-12}{5}^{-1} = \frac{-1}{1} \times \frac{-1}{1} = 1$$

Ques 4 The product of additive inverse and multiplicative inverse of  $-\frac{1}{4}$  is  $-1$

4) Additive inverse of  $-\frac{1}{4}$  is  $\frac{1}{4}$   
 Multiplicative inverse of  $\frac{1}{4}$  is  $-\frac{4}{1}$

$$\text{Product} = \frac{1}{4} \times \frac{-4}{1} = \frac{-1}{1} = -1$$

Ques 5) The reciprocal of a negative rational number is a negative rational number.



Ques-6 which rational numbers are equal to their reciprocals?

a.) 0, 1    b.) -1, 0    c.) -1, 1    d.) -1, 0

Ans → -1, 1  
 $-1 \times -1 = 1$   
 $1 \times 1 = 1$

Ques-7 which of the following expressions shows that rational numbers are associative under multiplication?

a.)  $\frac{4}{5} \times \left[ \frac{-6}{7} \times \frac{8}{9} \right] = \left[ \frac{4}{5} \times \frac{-6}{7} \right] \times \frac{8}{9}$

b.)  $\frac{4}{5} \times \left[ \frac{-6}{7} \times \frac{8}{9} \right] = \frac{4}{5} \times \left[ \frac{-8}{9} \times \frac{-6}{7} \right]$

c.)  $\frac{4}{5} \times \left[ \frac{6}{7} \times \frac{8}{9} \right] = \left[ \frac{8}{9} \times \frac{4}{5} \right] \times \frac{-6}{7}$

d.)  $\left[ \frac{4}{5} \times \frac{-6}{7} \right] \times \frac{8}{9} = \left[ \frac{-6}{7} \times \frac{4}{5} \right] \times \frac{8}{9}$

a.)  $\frac{4}{5} \times \left[ \frac{-6}{7} \times \frac{8}{9} \right] = \left[ \frac{4}{5} \times \frac{-6}{7} \right] \times \frac{8}{9}$

$$\left[ \frac{a}{b} \times \frac{c}{d} \right] \times \frac{e}{f} = \frac{a}{b} \times \left[ \frac{c}{d} \times \frac{e}{f} \right]$$

8.)  $-\frac{1}{4} \times \left[ \frac{2}{5} + \left[ \frac{-5}{6} \right] \right] = ?$

a.)  $\left[ -\frac{1}{4} \times \frac{2}{5} \right] + \left[ -\frac{1}{4} \times \left[ \frac{-5}{6} \right] \right]$

b)  $\left[ \frac{-1}{4} \times \frac{2}{5} \right] - \left[ \frac{-5}{6} \right]$

c)  $\frac{2}{5} + \left[ \frac{-1}{4} \right] \times \left[ \frac{-5}{6} \right]$

d)  $\left[ \frac{2}{5} + \left[ \frac{-5}{6} \right] \right] - \frac{1}{4}$

a)  $\left[ \frac{-1}{4} \times \frac{2}{5} \right] + \left[ \frac{-1}{4} \times \left[ \frac{-5}{6} \right] \right]$

Distributive law of Multiplication over addition

Ques 9] By what rational number should  $\frac{-5}{24}$  be multiplied to get 10?

$x \times \frac{-5}{24} = 10$

$x = \frac{10 \times 24}{-5 \times -1} = \frac{24 \times 2}{-1} = \frac{48}{-1} = -48$

Ques 10] What should be added to  $-\frac{3}{4}$  to get  $\frac{7}{6}$ ?

$x + \left[ \frac{-3}{4} \right] = \frac{7}{6}$

$x - \frac{3}{4} = \frac{7}{6}$

$$\begin{array}{r} 2 \overline{) 6.4} \\ \underline{2 \ 3.2} \\ 3 \ 3.1 \\ \underline{3 \ 0} \\ 11 \end{array}$$
 LCM = 12

$x = \frac{7}{6} + \frac{3}{4}$



$$\Rightarrow \frac{7 \times 2 + 3 \times 3}{12}$$

$$\Rightarrow \frac{14 + 9}{12} \Rightarrow \frac{23}{12}$$

Ques-11 What should be subtracted from  $\frac{7}{8}$  so as to get  $\frac{5}{12}$ ?

$$\frac{7}{8} - x = \frac{5}{12}$$

$$\frac{7}{8} - \frac{5}{12} = x$$

$$\frac{-7 \times 3 - 5 \times 2}{24} = x$$

$$\frac{-21 - 10}{24} = x$$

$$\frac{-31}{24} = x$$

$$\begin{array}{r} 2 \overline{) 8, 12} \\ 2 \overline{) 4, 6} \\ 2 \overline{) 2, 3} \\ 3 \overline{) 1, 3} \\ 1, 1 \end{array}$$

LCM - 24

Ques-12 The sum of two rational numbers is -3. If one of the numbers is  $-\frac{7}{5}$ , then the other number is

Let the other number be x

$$x - \frac{7}{5} + x = -3$$

$$x = \frac{-3}{1} + \frac{7}{5}$$



$$x = \frac{-3 \times 5 + 7 \times 1}{5}$$

$$= \frac{15 - 15 + 7}{5} = \frac{-8}{5}$$

Ques 13 The product of two numbers is  $-\frac{16}{35}$  If one of these numbers is  $-\frac{15}{14}$ , then the other is

Let the other number be  $x$

$$\frac{-16}{35} \times x = \frac{-15}{14} \times x = \frac{-16}{35}$$

$$x = \frac{-16}{35} \div \frac{-15}{14}$$

$$= \frac{-16}{35} \times \frac{14}{-15}$$

$$= \frac{-16 \times 2}{5 \times (-15)} = \frac{+32}{+75} = \frac{32}{75}$$

Ques 14 Which of the following numbers is in standard form?

a)  $\frac{-12}{26} \rightarrow \frac{-12 - 6}{26 \times 3} = \frac{-6}{13}$

b)  $\frac{-49}{70} = \frac{-49 - 7}{70 \div 10} = \frac{-7}{10}$

1)  $\frac{-9}{16}$  is in standard form

$$1) \frac{28}{-105} = \frac{28 \div 7}{-105 \div 7} = \frac{4}{-15}$$

$$5.) \left[ \frac{-9}{16} \times \frac{8}{15} \right] = ?$$

$$\frac{-9 \cdot 8}{2 \cdot 16} \times \frac{8 \cdot 1}{15} = \frac{-3 \cdot 1}{2 \cdot 5} = \frac{-3}{10}$$

$$6.) \left[ \frac{-5 \div 2}{9 \div 3} \right] = ?$$

$$\frac{-5 \div 2}{9 \div 3} = \frac{-5}{3} \times \frac{2 \cdot 1}{2} = \frac{-5 \cdot 1}{3 \cdot 2} = \frac{-5}{6}$$

$$17.) \frac{4}{9} \div ? = \frac{-8}{15}$$

$$\frac{4}{9} \div x = \frac{-8}{15}$$

$$\frac{4}{9} \times \frac{1}{x} = \frac{-8}{15}$$

$$\frac{1}{x} = \frac{-8 \cdot 9}{15 \cdot 4}$$

$$\frac{1}{x} = \frac{-2 \cdot 3}{5 \cdot 1} \Rightarrow \frac{1}{x} = \frac{-6}{5}$$

$$x = \frac{5}{-6}$$

Ques-18 Between any two given rational numbers we can find

18.) infinitely many rational numbers

19.) A rational number between  $\frac{1}{5}$  and  $\frac{1}{2}$  is

$$\frac{1}{2} \left[ \frac{1}{5} + \frac{1}{2} \right]$$

$$= \frac{1}{2} \left[ \frac{1 \times 2 + 1 \times 5}{10} \right]$$

$$= \frac{1}{2} \left[ \frac{2+5}{10} \right]$$

$$= \frac{1}{2} \left[ \frac{7}{10} \right]$$

$$= \frac{1}{2} \times \frac{7}{10} = \frac{7}{20} \quad \frac{1 \times 7}{2 \times 10} = \frac{7}{20}$$

LCM  
 $2 \overline{) 5} 2$   
 $5 \overline{) 5} 1$   
 LCM =  $5 \times 2 = 10$

20.) Identify a rational number between  $\frac{1}{3}$  and  $\frac{4}{5}$

$$\frac{1}{2} \left[ \frac{1}{3} + \frac{4}{5} \right]$$

$$\frac{1}{2} \left[ \frac{1 \times 5 + 4 \times 3}{15} \right]$$

LCM  
 $3 \overline{) 5} 5$   
 $5 \overline{) 3} 5$   
 LCM =  $3 \times 5 = 15$



$$= \frac{1}{2} \left[ \frac{5+12}{15} \right]$$

$$= \frac{1}{2} \times \frac{17}{15}$$

$$= \frac{1 \times 17}{2 \times 15} = \frac{17}{30}$$

Ques 2) The arrangement of rational numbers  $-\frac{7}{10}, \frac{5}{-8}, \frac{2}{-3}$ , in ascending order is

$$\frac{5}{-8} \times \frac{-1}{-1} = \frac{-5}{8}$$

$$\frac{2}{-3} \times \frac{-1}{-1} = \frac{-2}{3}$$

$$\frac{-7}{10}, \frac{-5}{8}, \frac{-2}{3}$$

$$\begin{array}{r} \text{LCM} \\ 2 \mid 10, 8, 3 \\ 2 \mid 5, 4, 3 \\ 2 \mid 5, 2, 3 \\ 3 \mid 5, 1, 3 \\ 5 \mid 5, 1, 1 \\ 1, 1, 1 \\ \text{LCM} = 120 \end{array}$$

$$= \frac{-7 \times 12}{120}, \frac{-5 \times 15}{120}, \frac{-2 \times 60}{120}$$

$$= \frac{-84}{120}, \frac{-75}{120}, \frac{-80}{120}$$

$$\frac{-84}{120} < \frac{-80}{120} < \frac{-75}{120}$$

$$\frac{-2}{3} < \frac{-5}{8}$$

Mental Maths

1) Fill in the blanks -

i)  $\frac{-7}{8} + \frac{1}{11} = \frac{2}{11} + \left[\frac{-7}{8}\right]$  depicts commutative property of addition of rational numbers.

ii) The multiplicative inverse of a rational number is also called its reciprocal.

iii) The multiplicative inverse of a negative rational number is a negative rational number.

iv) The numbers 1 and -1 are their own reciprocals.

v)  $\left[\frac{-10}{11}\right] \div \frac{-10}{11} = 1$

vi)  $\left[\frac{-7}{9}\right] \times \frac{-9}{7} = 1$

vii) Among  $\frac{-5}{11}$ ,  $\frac{-5}{13}$  and  $\frac{-5}{7}$  the greatest rational number is

$\frac{-5}{11}, \frac{-5}{13}, \frac{-5}{7}$

$= \frac{-5 \times 91}{1001}, \frac{-5 \times 77}{1001}, \frac{-5 \times 143}{1001}$

$\begin{array}{r} 7 \overline{) 1113} \\ 11 \overline{) 1113} \\ 13 \overline{) 1113} \\ \hline 1001 \end{array}$   
 LCM = 1001



$$z \quad \frac{-455}{1001}, \frac{-385}{1001}, \frac{-715}{1001}$$

$$z \quad \frac{-715}{1001} < \frac{-455}{1001} < \frac{-385}{1001}$$

$$z \quad \frac{-5}{7} < \frac{-5}{11} < \frac{-5}{13}$$

$\frac{-5}{13}$  is greatest among  $\frac{-5}{7}$ ,  $\frac{-5}{11}$  and  $\frac{-5}{13}$ .

2.) write true or false.

i.) Every rational number has a reciprocal.  
False

ii.) Subtraction of rational numbers is commutative.  
False

iii.) The additive inverse of  $\frac{1}{4}$  is  $-4$ .  
False

iv.)  $\frac{5}{0}$  is a rational number.  
False

v.) 0 is the smallest rational number. False

vi.) The multiplicative inverse of  $\frac{-4}{-9}$  is  $\frac{9}{4}$ . ~~False~~ True

vii.) There are countless rational numbers between  $\frac{2}{3}$  and  $\frac{5}{6}$ . True



## Assignment-2

(Homework)

Ques 1 Insert five number between :-

1.) 2 and 3

$$2 = \frac{2}{1} \times \frac{6}{6} = \frac{12}{6}$$

$$3 = \frac{3}{1} \times \frac{6}{6} = \frac{18}{6}$$

Five rational numbers =  $\frac{13}{6}, \frac{14}{3}, \frac{15}{2}, \frac{16}{3}, \frac{17}{6}$   
 between 2 and 3 are

$$\text{or} = \frac{13}{6}, \frac{7}{3}, \frac{5}{2}, \frac{8}{3}, \frac{17}{6}$$

2.) 3 and 9

$$3 = \frac{3}{1}$$

$$9 = \frac{9}{1}$$

Five rational numbers =  $\frac{4}{1}, \frac{5}{1}, \frac{6}{1}, \frac{7}{1}, \frac{8}{1}$   
 between 3 and 9 are

or

$$4, 5, 6, 7, 8$$

3)  $\frac{1}{3}$  and  $\frac{3}{4}$

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

$$\frac{1}{3} = \frac{1}{3} \times \frac{4}{4} = \frac{4}{12} \quad \frac{3}{4} = \frac{3}{4} \times \frac{2}{2} = \frac{6}{8} = \frac{9}{12}$$

$$\frac{3}{4} = \frac{3}{4} \times \frac{3}{3} = \frac{9}{12} \quad \frac{1}{2} = \frac{1}{2} \times \frac{2}{2} = \frac{2}{4} = \frac{6}{12}$$

Five rational numbers between  $\frac{1}{3}$  and  $\frac{3}{4}$  are  $\frac{4}{12}, \frac{5}{12}, \frac{6}{12}, \frac{7}{12}, \frac{8}{12}$

OR  
 $\frac{3}{8}, \frac{5}{12}, \frac{11}{24}, \frac{1}{2}, \frac{13}{24}$

Ques-2 Insert seven numbers between:-

i)  $\frac{1}{7}$  and  $\frac{2}{8}$

$2 \overline{) 7, 8}$   
 $2 \overline{) 7, 4}$   
 $2 \overline{) 7, 2}$   
 $7 \overline{) 7, 1}$   
 $1, 1$   
 LCM = 56

$$\frac{1}{7} = \frac{1}{7} \times \frac{8}{8} = \frac{8}{56} \quad \frac{2}{8} = \frac{2}{8} \times \frac{7}{7} = \frac{14}{56} = \frac{28}{112}$$

$$\frac{2}{8} = \frac{2}{8} \times \frac{7}{7} = \frac{14}{56} \quad \frac{1}{2} = \frac{1}{2} \times \frac{2}{2} = \frac{2}{4} = \frac{28}{112}$$

Seven rational numbers between  $\frac{1}{7}$  and  $\frac{2}{8}$  are  $\frac{9}{56}, \frac{10}{56}, \frac{11}{56}, \frac{12}{56}, \frac{13}{56}, \frac{14}{56}, \frac{15}{56}$

OR  
 $\frac{17}{112}, \frac{9}{56}, \frac{19}{112}, \frac{5}{28}, \frac{3}{16}$

ii)  $\frac{1}{9}$  and  $\frac{1}{11}$

$$\frac{1}{9} \times \frac{11}{11} = \frac{11}{99} \times \frac{6}{6} = \frac{66}{594}$$

$$\frac{1}{11} \times \frac{9}{9} = \frac{9}{99} \times \frac{6}{6} = \frac{54}{594}$$

Seven rational numbers between  $\frac{1}{9}$  and  $\frac{1}{11}$  are  $\frac{55}{594}, \frac{56}{594}, \frac{57}{594}, \frac{58}{594}, \frac{59}{594}, \frac{60}{594}, \frac{61}{594}$

Or  
 $\frac{55}{594}, \frac{28}{297}, \frac{19}{198}, \frac{12}{132}$