

Rational Numbers

Exercise 1.1 :-

1.

$$i) \quad \frac{4}{7} + \frac{5}{7}$$

$$\frac{4+5}{7}$$

$$\frac{9}{7}$$

ii)

$$\frac{7}{-13} \text{ and } \frac{4}{-13}$$

$$\frac{7}{-13} + \frac{4}{-13}$$

$$\frac{7 \times (-1)}{-13 \times (-1)} + \frac{4 \times (-1)}{-13 \times (-1)}$$

Make denominator as +ve number

$$\frac{-7}{13} + \frac{-4}{13}$$

$$\frac{-7+(-4)}{13} = \frac{-11}{13}$$

2. To verify $\frac{5}{11} + 4\frac{3}{9}$

$$\frac{5}{11} + \frac{34}{9}$$

$$\frac{5 \times 9 + 34 \times 11}{99}$$

L.C.M of 11, 9 = 99

$$\frac{45 + 429}{99}$$

$$\frac{474}{99} = \frac{158}{33}$$

$$ii) \quad -\frac{4}{9} + 2\frac{12}{13}$$

$$-\frac{4}{9} + \frac{38}{13}$$

$$\frac{-4 \times 13 + 38 \times 9}{117}$$

$$\text{LCM of } 9, 13 = 117$$

$$\frac{-52 + 342}{117}$$

$$\frac{290}{117}$$

3.

To verify the commutative property of addition, we have to

$$\text{Show } -\frac{4}{3} + \frac{3}{7} = \frac{3}{7} + \left(-\frac{4}{3}\right)$$

$$\text{L.H.S} = -\frac{4}{3} + \frac{3}{7}$$

$$\frac{-4 \times 7 + 3 \times 3}{21}$$

$$\text{LCM of } 3, 7 = 21$$

$$\frac{-28 + 9}{21}$$

$$\text{L.H.S} = \frac{-19}{21}$$

$$\text{R.H.S} = \frac{3}{7} + \left(-\frac{4}{3}\right)$$

$$= \frac{3 \times 3 + (-4) \times 7}{21}$$

$$\text{LCM of } 3, 7 = 21$$

$$= \frac{9 - 28}{21}$$

$$\text{R.H.S} = \frac{-19}{21}$$

$$\therefore \text{L.H.S} = \text{R.H.S}$$

$$-\frac{4}{3} + \frac{3}{7} = \frac{3}{7} + \left(-\frac{4}{3}\right)$$

ii) To verify Commutative law of addition, we have 3

to show $\left(\frac{-2}{-5}\right) + \frac{1}{3} = \frac{1}{3} + \left(\frac{-2}{-5}\right)$

$$\text{L.H.S} = \frac{-2}{-5} + \frac{1}{3}$$

$$= \frac{-2 \times (-1)}{-5 \times (-1)} + \frac{1}{3} \quad \text{Make denominator +ve number}$$

$$= \frac{2}{5} + \frac{1}{3}$$

$$= \frac{2 \times 3 + 1 \times 5}{15} \quad \text{LCM of } 5, 3 = 15$$

$$= \frac{6+5}{15}$$

$$\text{L.H.S} = \frac{11}{15}$$

$$\text{R.H.S} = \frac{1}{3} + \left(\frac{-2}{-5}\right)$$

$$= \frac{1}{3} + \left(\frac{-2 \times (-1)}{-5 \times (-1)}\right) \quad \text{L.C.M.}$$

Make denominator +ve

$$= \frac{1}{3} + \frac{2}{5}$$

$$= \frac{1 \times 5 + 2 \times 3}{15} \quad \text{LCM of } 3, 5 = 15$$

$$= \frac{5+6}{15}$$

$$\text{R.H.S} = \frac{11}{15}$$

$$\text{L.H.S} = \text{R.H.S}$$

$$\left(\frac{-2}{-5}\right) + \frac{1}{3} = \frac{1}{3} + \left(\frac{-2}{-5}\right)$$

∴ Commutative law of addition is verified

iii) $\frac{9}{11}$ and $\frac{2}{13}$

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To verify the commutative law of addition, we have to

Show $\frac{9}{11} + \frac{2}{13} = \frac{2}{13} + \frac{9}{11}$

$$\text{L.H.S} = \frac{9}{11} + \frac{2}{13}$$

$$= \frac{(9 \times 13) + (2 \times 11)}{143} \quad \text{LCM of } 11, 13 = 143$$

$$= \frac{117 + 22}{143}$$

$$\text{L.H.S} = \frac{139}{143}$$

$$\text{R.H.S} = \frac{2}{13} + \frac{9}{11}$$

$$= \frac{(2 \times 11) + (9 \times 13)}{143} \quad \text{LCM of } 13, 11 = 143$$

$$= \frac{22 + 117}{143}$$

$$\text{R.H.S} = \frac{139}{143}$$

$$\therefore \text{L.H.S} = \text{R.H.S}$$

$$\frac{9}{11} + \frac{2}{13} = \frac{2}{13} + \frac{9}{11}$$

∴ Commutative law of addition is verified.

4.

i) The additive inverse of $\frac{2}{-3} = -\left(\frac{2}{-3}\right)$

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

$$= -\left(\frac{-2}{3}\right)$$

$$= \frac{2}{3}$$

ii) The additive inverse of $\frac{-7}{-12} = -\left(\frac{-7}{-12}\right)$

$$= -\left(\frac{-7 \times (-1)}{-12 \times (-1)}\right)$$

$$= -\left(\frac{7}{12}\right)$$

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

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

5.

$$x = \frac{10}{13}$$

$$-x = -\frac{10}{13}$$

$$-(-x) = -\left(-\frac{10}{13}\right)$$

$$= \frac{-1 \times (-10)}{13}$$

$$-(-x) = \frac{10}{13}$$

$$\underline{\underline{-(-x) = x}}$$

ii)

$$x = \frac{-5}{17}$$

$$\begin{aligned} -x &= -1 \times \frac{-5}{17} \\ &= \frac{(-1) \times (-5)}{17} \end{aligned}$$

$$-x = \frac{5}{17}$$

$$-(-x) = -\left(\frac{5}{17}\right)$$

$$-(-x) = -\frac{5}{17} - \frac{1 \times 5}{17}$$

$$-(-x) = \frac{-5}{17}$$

$$-(-x) = x$$

6.

$$\Rightarrow \frac{4}{5} + \frac{11}{7} + \left(\frac{-7}{5}\right) + \left(\frac{-2}{7}\right)$$

$$\left[\frac{4}{5} + \left(\frac{-7}{5}\right)\right] + \left[\frac{11}{7} + \left(\frac{-2}{7}\right)\right]$$

(Using Commutative and associativity of addition)

$$\left[\frac{4-7}{5}\right] + \left[\frac{11-2}{7}\right]$$

$$\left[\frac{-3}{5}\right] + \left[\frac{9}{7}\right]$$

$$\frac{(-3 \times 7) + (9 \times 5)}{35}$$

LCM of 5, 7 = 35

$$\frac{-21 + 45}{35} = \frac{24}{35}$$

$$ii) \frac{3}{7} + \frac{4}{9} + \left(\frac{-5}{21}\right) + \frac{2}{3}$$

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$$\left[\frac{3}{7} + \left(\frac{-5}{21}\right)\right] + \left[\frac{4}{9} + \frac{2}{3}\right]$$

(By using the Commutative and associativity of addition)

$$\left[\frac{(3 \times 3) + (-5 \times 1)}{21}\right] + \left[\frac{4 \times 1 + 2 \times 3}{9}\right]$$

$$\text{LCM of } 7, 21 = 21$$

$$\text{LCM of } 9, 3 = 9$$

$$\left[\frac{9-5}{21}\right] + \left[\frac{4+6}{9}\right]$$

$$\frac{4}{21} + \frac{10}{9}$$

$$\frac{(4 \times 3) + (10 \times 7)}{63}$$

$$\text{LCM of } 21, 9 = 63$$

$$\frac{12+70}{63}$$

$$\frac{82}{63}$$

$$1 \frac{19}{63}$$

7.

i. $\left(\frac{-4}{9}\right) + \frac{2}{3}$ is a rational number

$$ii) \frac{43}{89} + \left(\frac{-51}{47}\right) = \left(\frac{-51}{47}\right) + \frac{43}{89}$$

$$iii) \frac{2}{7} + \frac{0}{7} = \frac{2}{7} + 0 = 0 + \frac{2}{7}$$

$$iv) \frac{4}{11} + \left[\left(\frac{-7}{12} \right) + \frac{9}{16} \right] = \left[\frac{4}{11} + \left(\frac{-7}{12} \right) \right] + \frac{9}{16}$$

$$v) \frac{5}{9} + \left(\frac{-5}{9} \right) = 0 = \left(\frac{-5}{9} \right) + \frac{5}{9}$$

8. Given $a = \frac{-11}{27}$

$$b = \frac{4}{9}$$

$$c = \frac{-5}{18}$$

L.H.S

$$a + (b + c) = \frac{-11}{27} + \left(\frac{4}{9} + \left(\frac{-5}{18} \right) \right)$$

$$= \frac{-11}{27} + \left[\frac{4 \times 2 + (-5 \times 1)}{18} \right] \quad \text{LCM of } 9, 18 = 18$$

$$= \frac{-11}{27} + \left[\frac{8-5}{18} \right]$$

$$= \frac{-11}{27} + \frac{3}{18}$$

$$= \frac{(-11 \times 2) + (3 \times 3)}{54} \quad \text{LCM of } 27, 18 = 54$$

$$= \frac{-22+9}{54}$$

R.H.S = $\frac{-13}{54}$

$$\text{R.H.S } (a+b)+c = \left(\frac{-11}{27} + \frac{4}{9}\right) + \left(\frac{-5}{18}\right)$$

9

$$= \frac{(-11 \times 1) + (4 \times 3)}{27} + \left(\frac{-5}{18}\right)$$

LCM of 27, 9 = 27

$$= \frac{-11+12}{27} + \left(\frac{-5}{18}\right)$$

$$= \frac{1}{27} + \left(\frac{-5}{18}\right)$$

$$= \frac{(1 \times 2) + (-5 \times 3)}{54}$$

LCM of 27, 18 = 54

$$= \frac{2-15}{54}$$

$$\text{R.H.S} = \frac{-13}{54}$$

$$\therefore \text{L.H.S} = \text{R.H.S}$$

$$a+(b+c) = (a+b)+c$$

Exercise - 1.2

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$$i) \quad 2\frac{2}{3} = \frac{2 \times 3 + 2}{3} = \frac{8}{3}$$

$$2\frac{2}{3} - \left(-\frac{3}{7}\right)$$

$$\frac{8}{3} - \left(-\frac{3}{7}\right)$$

$$\frac{8}{3} + \frac{3}{7}$$

$$\frac{(8 \times 7) + (3 \times 3)}{21}$$

LCM of 3, 7 = 21

$$\frac{56 + 9}{21}$$

$$\frac{65}{21}$$

ii)

$$-\frac{4}{9} - \left(3\frac{5}{8}\right)$$

$$-\frac{4}{9} - \left(\frac{29}{8}\right)$$

$$-\frac{4}{9} - \frac{29}{8}$$

$$\frac{-4 \times 8 - (29 \times 9)}{72}$$

LCM of 9, 8 = 72

$$\frac{-293}{72}$$

iii)

$$-3\frac{1}{5} - \left(-4\frac{7}{9}\right)$$

$$-\frac{16}{5} - \left(-\frac{43}{9}\right)$$

$$-\frac{16}{5} + \frac{43}{9}$$

$$\frac{(-16 \times 9) + (43 \times 5)}{45}$$

LCM of 5, 9 = 45

$$\frac{-144 + 215}{45}$$

$$\frac{71}{45}$$

3. Let the unknown number as x .

$$-\frac{5}{11} + x = -\frac{7}{8}$$

$$x = -\frac{7}{8} - \left(-\frac{5}{11}\right)$$

$$= -\frac{7}{8} + \frac{5}{11}$$

$$= \frac{(-7 \times 11) + (8 \times 5)}{88} \quad \text{LCM of } 11, 8 = 88$$

$$= \frac{-77 + 40}{88}$$

$$x = \frac{-37}{88}$$

$$x = -\frac{37}{88}$$

20.

Let the unknown number be x

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

$$x = \frac{3}{5} - \left(-\frac{2}{7}\right)$$

$$x = \frac{3}{5} + \frac{2}{7}$$

$$= \frac{(3 \times 7) + (2 \times 5)}{35} \quad (\because \text{LCM of } 5, 7 = 35)$$

$$= \frac{21 + 10}{35}$$

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

4.

Let the unknown number be x

12

$$-4\frac{3}{5} - x = -3\frac{1}{2}$$

$$-\frac{23}{5} - x = -\frac{7}{2}$$

$$-\frac{23}{5} = -\frac{7}{2} + x$$

$$x = -\frac{23}{5} + \frac{7}{2}$$

$$= \frac{(-23 \times 2) + (7 \times 5)}{10}$$

LCM of 5, 2 = 10

$$= \frac{-46 + 35}{10}$$

$$x = -\frac{11}{10}$$

5.

$$\left[-\frac{5}{7} + \left(\frac{-8}{3} \right) \right] - \left[\frac{5}{2} + \left(\frac{-11}{12} \right) \right]$$

$$\left[\frac{(-5 \times 3) + (-8 \times 7)}{21} \right] - \left[\frac{5 \times 6 + (-11 \times 1)}{12} \right]$$

$$\left[\frac{-15 - 56}{21} \right] - \left[\frac{30 - 11}{12} \right]$$

$$\left[\frac{-71}{21} \right] - \left[\frac{19}{12} \right]$$

$$\frac{(-71 \times 4) - (19 \times 7)}{84}$$

$$\frac{-284 - 133}{84}$$

$$= -\frac{417}{84} = -\frac{139}{28} = -\frac{139}{28} //$$

$$6. \quad x = \frac{4}{9}; \quad y = -\frac{7}{12}$$

Consider

$$x - y = \frac{4}{9} - \left(-\frac{7}{12}\right)$$

$$= \frac{4}{9} + \frac{7}{12}$$

$$= \frac{(4 \times 4) + (7 \times 3)}{36} \quad (\because \text{LCM of } 9, 12 = 36)$$

$$= \frac{16 + 21}{36}$$

$$x - y = \frac{37}{36}$$

Consider

$$y - x = -\frac{7}{12} - \left(\frac{4}{9}\right)$$

$$= -\frac{7}{12} - \frac{4}{9}$$

$$= \frac{(-7 \times 3) - (4 \times 4)}{36} \quad \text{LCM of } 9, 12 = 36$$

$$= \frac{-21 - 16}{36}$$

$$y - x = -\frac{37}{36}$$

$$\therefore x - y \neq y - x.$$

7.

$$x = \frac{4}{9}; \quad y = \frac{2}{5}; \quad y = -\frac{7}{12}; \quad z = -\frac{2}{3}$$

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Consider

$$x - (y - z) = \frac{4}{9} - \left(-\frac{7}{12} - \left(-\frac{2}{3} \right) \right)$$

$$= \frac{4}{9} - \left(-\frac{7}{12} + \frac{2}{3} \right)$$

$$= \frac{4}{9} - \left(\frac{(-7 \times 1) + (2 \times 4)}{12} \right)$$

$$= \frac{4}{9} - \left(\frac{-7 + 8}{12} \right)$$

$$= \frac{4}{9} - \frac{1}{12}$$

$$= \frac{(4 \times 4) - (1 \times 3)}{36}$$

$$= \frac{16 - 3}{36}$$

$$x - (y - z) = \frac{13}{36}$$

Consider

$$(x - y) - z = \left[\frac{4}{9} - \left(-\frac{7}{12} \right) \right] - \left(-\frac{2}{3} \right)$$

$$= \left[\frac{4}{9} + \frac{7}{12} \right] + \frac{2}{3}$$

$$= \left[\frac{(4 \times 4) + (7 \times 3)}{36} \right] + \frac{2}{3}$$

$$= \frac{16 + 21}{36} + \frac{2}{3}$$

$$= \frac{37}{36} + \frac{2}{3}$$

$$= \frac{(37 \times 1) + (2 \times 12)}{36}$$

$$= \frac{37+24}{36}$$

$$(x-y)-z = \frac{61}{36}$$

$$\therefore x-(y-z) \neq (x-y)-z$$

8.

$$i) \frac{2}{3} - \frac{4}{5}$$

$$\frac{(2 \times 5) - (4 \times 3)}{15} \quad \text{LCM of } 3, 5 = 15$$

$$\frac{10-12}{15}$$

$$-\frac{2}{5} \quad \text{It is a Rational Number}$$

So, given statement is False

ii) True

$$-\frac{5}{7} + \frac{5}{7} = 0$$

Exercise 1.3

1.

i. $\frac{6}{-7} \times \frac{14}{30}$

$$\frac{6 \times 14}{-7 \times 30}$$

$$-\frac{84}{210}$$

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

ii. $6\frac{2}{3} \times 1\frac{2}{7}$

$$\frac{20}{3} \times \frac{9}{7}$$

$$\frac{20 \times 9}{3 \times 7}$$

$$\frac{180}{21}$$

$$\frac{60}{7}$$

iii)

$$\frac{25}{-9} \times \frac{-3}{10}$$

$$\frac{25 \times (-3)}{-9 \times 10}$$

$$\frac{-75}{-90}$$

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

$$\frac{5}{6}$$

i.

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i. To verify commutative property of multiplication we have

$$\text{to show } \frac{4}{5} \times \frac{-7}{8} = \frac{-7}{8} \times \frac{4}{5}$$

$$\text{L.H.S} = \frac{4 \times -7}{5 \times 8}$$

$$= \frac{-28}{40}$$

$$\text{L.H.S} = \frac{-7}{10}$$

$$\text{R.H.S} = \frac{-7}{8} \times \frac{4}{5}$$

$$= \frac{-7 \times 4}{8 \times 5}$$

$$= \frac{-28}{40}$$

$$\text{R.H.S} = \frac{-7}{10}$$

$$\therefore \text{L.H.S} = \text{R.H.S}$$

\therefore Commutative property of multiplication is verified.

ii.

To verify commutative property of multiplication we have

$$\text{to show } 13\frac{1}{3} \times 1\frac{1}{8} = 1\frac{1}{8} \times 13\frac{1}{3}$$

$$\text{L.H.S} = 13\frac{1}{3} \times 1\frac{1}{8}$$

$$= \frac{40}{3} \times \frac{9}{8}$$

$$= \frac{40 \times 9}{3 \times 8}$$

$$= \frac{360}{24}$$

$$\text{L.H.S} = \underline{15}$$

$$R.H.S = 1\frac{1}{8} \times 13\frac{1}{3}$$

$$= \frac{9}{8} \times \frac{40}{3}$$

$$= \frac{360}{24}$$

$$R.H.S = 15$$

$$L.H.S = R.H.S$$

\therefore Commutative property of multiplication is verified

iii) To verify commutative property of multiplication we have

$$\text{to show } \frac{-7}{-20} \times \frac{5}{-14} = \frac{5}{-14} \times \left(\frac{-7}{-20}\right)$$

$$L.H.S = \frac{-7}{-20} \times \frac{5}{-14}$$

$$= \frac{-7 \times 5}{-20 \times (-14)}$$

$$= \frac{-35}{280}$$

$$L.H.S = \frac{-1}{8}$$

$$R.H.S = \frac{5}{-14} \times \frac{-7}{-20}$$

$$= \frac{5 \times (-7)}{-14 \times (-20)}$$

$$= \frac{-35}{280}$$

$$R.H.S = \frac{-1}{8}$$

$$L.H.S = R.H.S$$

\therefore Commutative property of multiplication is verified.

3.

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$$1. \quad \frac{3}{5} \times \left(\frac{-4}{7} \times \frac{-8}{9} \right) = \left(\frac{3}{5} \times \frac{-4}{7} \right) \times \frac{-8}{9}$$

$$\text{L.H.S} = \frac{3}{5} \times \left(\frac{-4}{7} \times \frac{-8}{9} \right)$$

$$= \frac{3}{5} \times \left(\frac{-4 \times (-8)}{7 \times 9} \right)$$

$$= \frac{3}{5} \times \left(\frac{32}{63} \right)$$

$$= \frac{3 \times 32}{5 \times 63}$$

$$= \frac{96}{315}$$

$$\text{L.H.S} = \frac{32}{105}$$

$$\text{R.H.S} = \left(\frac{3}{5} \times \frac{-4}{7} \right) \times \left(\frac{-8}{9} \right)$$

$$= \left(\frac{-3 \times (-4)}{5 \times 7} \right) \times \left(\frac{-8}{9} \right)$$

$$= \frac{-12}{35} \times \frac{-8}{9}$$

$$= \frac{-12 \times (-8)}{35 \times 9}$$

$$= \frac{96}{315}$$

$$\text{R.H.S} = \frac{32}{105}$$

L.H.S = R.H.S, Hence proved

\therefore This law is called "Associative property of multiplication"

$$ii) \frac{5}{9} \times \left(\frac{-3}{2} + \frac{7}{5} \right) = \frac{5}{9} \times \frac{-3}{2} + \frac{5}{9} \times \frac{7}{5}$$

$$L.H.S = \frac{5}{9} \times \left(\frac{-3}{2} + \frac{7}{5} \right)$$

$$= \frac{5}{9} \times \left(\frac{(-3 \times 5) + (7 \times 2)}{10} \right) \quad \text{LCM of } 2, 5 = 10$$

$$= \frac{5}{9} \times \left(\frac{-15 + 14}{10} \right)$$

$$= \frac{5}{9} \times \left(\frac{-1}{10} \right)$$

$$L.H.S = \frac{-1}{18}$$

$$R.H.S = \left(\frac{5}{9} \times \frac{-3}{2} \right) + \left(\frac{5}{9} \times \frac{7}{5} \right)$$

$$= \left[\frac{5 \times (-3)}{18} \right] + \left[\frac{5 \times 7}{9 \times 5} \right]$$

$$= \frac{-15}{18} + \frac{35}{45}$$

$$= \frac{(-15 \times 5) + (35 \times 2)}{90}$$

$$= \frac{-75 + 70}{90}$$

$$= \frac{-5}{90}$$

$$R.H.S = \frac{-1}{18}$$

$\therefore L.H.S = R.H.S$, Hence proved

This law is called "Distributive law of multiplication over addition"

4.

$$i) \quad 12 \cdot \text{reciprocal of } 12 = \frac{1}{12}$$

$\therefore \frac{1}{12}$ is multiplicative inverse of 12

$$ii) \quad \text{reciprocal of } \frac{2}{3} = \frac{3}{2}$$

$\therefore \frac{3}{2}$ is multiplicative inverse of $\frac{2}{3}$

$$iii) \quad \text{reciprocal of } \frac{-4}{7} = \frac{7}{-4} \text{ (or) } -\frac{7}{4}$$

$\therefore -\frac{7}{4}$ is multiplicative inverse of $\frac{-4}{7}$

iv)

$$-\frac{3}{8} \times \left(\frac{-7}{13}\right) = \frac{-3 \times (-7)}{8 \times 13} = \frac{21}{104}$$

reciprocal of $\frac{21}{104}$ is $\frac{104}{21}$

$\therefore \frac{104}{21}$ is multiplicative inverse of $-\frac{3}{8} \times \left(\frac{-7}{13}\right)$

5.

$$i) \quad \frac{2}{5} \times \frac{-3}{7} - \frac{1}{14} = \frac{3}{7} \times \frac{3}{5}$$

$$\frac{2 \times (-3)}{5 \times 7} - \frac{1}{14} = \frac{(3 \times 3)}{7 \times 5}$$

$$\frac{-6}{35} - \frac{1}{14} = \frac{9}{35}$$

$$\frac{(-6 \times 2) - (1 \times 5) - (9 \times 2)}{70}$$

$$\frac{-12 - 5 - 18}{70}$$

$$\frac{-35}{70}$$

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

LCM of 35, 14, 35 = 70

ii)

$$\frac{8}{9} \times \frac{4}{5} + \frac{5}{6} - \frac{9}{5} \times \frac{8}{9}$$

$$\frac{(8 \times 4)}{9 \times 5} + \frac{5}{6} - \frac{(9 \times 8)}{(5 \times 9)}$$

$$\frac{32}{45} + \frac{5}{6} - \frac{72}{45}$$

$$\frac{(32 \times 2) + (5 \times 15) - (72 \times 2)}{90}$$

$$\text{LCM of } 45, 6, 45 = 90$$

$$\frac{64 + 75 - 144}{90}$$

$$90$$

$$\frac{-15}{90}$$

$$\frac{-4}{18}$$

$$\frac{-1}{18}$$

iii)

$$-\frac{3}{7} \times \frac{14}{15} \times \frac{7}{12} \times \left(-\frac{30}{35}\right)$$

$$\frac{-3 \times 14 \times 7}{7 \times 15 \times 12} \times \left(-\frac{30}{35}\right)$$

$$\frac{-294}{1260} \times \left(-\frac{30}{35}\right)$$

$$\frac{-294 \times (-30)}{1260 \times 35}$$

$$\frac{1}{5}$$

$$6. \quad P = \frac{-8}{27}, \quad Q = \frac{3}{4}, \quad R = \frac{-12}{15}$$

$$\Rightarrow P \times (Q \times R) = (P \times Q) \times R$$

$$\begin{aligned} \text{L.H.S} &= P \times (Q \times R) \\ &= \frac{-8}{27} \times \left(\frac{3}{4} \times \left(\frac{-12}{15} \right) \right) \\ &= \frac{-8}{27} \times \left(\frac{3 \times (-12)}{4 \times 15} \right) \\ &= \frac{-8}{27} \times \left(\frac{-36}{60} \right) \\ &= \frac{-8 \times (-36)}{27 \times 60} \end{aligned}$$

$$\text{L.H.S} = \frac{8}{45}$$

$$\begin{aligned} \text{R.H.S} &= (P \times Q) \times R \\ &= \left(\frac{-8}{27} \times \frac{3}{4} \right) \times \left(\frac{-12}{15} \right) \\ &= \left(\frac{-8 \times 3}{27 \times 4} \right) \times \left(\frac{-12}{15} \right) \\ &= \frac{-24}{108} \times \left(\frac{-12}{15} \right) \\ &= \frac{-24 \times -12}{108 \times 15} \end{aligned}$$

$$\text{R.H.S} = \frac{8}{45}$$

\therefore L.H.S = R.H.S, Hence verified.

$$ii) \quad P \times (q - r) = P \times q - P \times r$$

$$\begin{aligned} \text{L.H.S} &= P \times (q - r) \\ &= \frac{-8}{27} \times \left(\frac{3}{4} - \left(\frac{-12}{15} \right) \right) \\ &= \frac{-8}{27} \times \left(\frac{3}{4} + \frac{12}{15} \right) \\ &= \frac{-8}{27} \times \left(\frac{(3 \times 15) + (12 \times 4)}{60} \right) \\ &= \frac{-8}{27} \times \left(\frac{45 + 48}{60} \right) \\ &= \frac{-8}{27} \times \frac{93}{60} \\ &= \frac{-8}{27} \times \frac{31}{20} \end{aligned}$$

$$\text{L.H.S} = -\frac{62}{135}$$

$$\begin{aligned} \text{R.H.S} &= P \times q - P \times r \\ &= \frac{-8}{27} \times \frac{3}{4} - \left(\frac{-8}{27} \times \left(\frac{-12}{15} \right) \right) \\ &= \frac{-8 \times 3}{27 \times 4} - \left(\frac{-8 \times (-12)}{27 \times 15} \right) \\ &= \frac{-24}{27 \times 4} - \left(\frac{96}{405} \right) \\ &= \frac{-24}{108} - \frac{96}{405} \\ &= -\frac{2}{9} - \frac{32}{135} \\ &= \frac{(-2 \times 15) - (32 \times 1)}{135} \end{aligned}$$

$$= \frac{-30-32}{135}$$

$$\text{R.H.S} = \frac{-62}{135}$$

$\therefore \text{L.H.S} = \text{R.H.S}$; Hence Verified.

7. $\Rightarrow \frac{2}{3} \times \frac{-4}{5}$ is a Rational number

$$\text{ii)} \quad \frac{54}{81} \times \frac{-63}{108} = \frac{-63}{108} \times \frac{54}{81}$$

$$\text{iii)} \quad \frac{4}{5} \times 1 = \frac{4}{5} = 1 \times \frac{4}{5}$$

$$\text{iv)} \quad \frac{5}{-12} \times \frac{-12}{5} = 1 = \frac{-12}{5} \times \frac{5}{-12}$$

$$\text{v)} \quad \frac{3}{7} \times \left(\frac{-2}{8} \times \frac{5}{9} \right) = \left(\frac{3}{7} \times \frac{-2}{8} \right) \times \frac{5}{9}$$

$$\text{vi)} \quad \frac{-8}{9} \times \left[\frac{4}{13} + \frac{5}{17} \right] = \left(\frac{-8}{9} \times \frac{4}{13} \right) + \left(\frac{-8}{9} \times \frac{5}{17} \right)$$

$$\text{vii)} \quad \frac{-6}{13} \times \left[\frac{8}{9} - \frac{4}{7} \right] = \frac{-6}{13} \times \frac{8}{9} - \left(\frac{-6}{13} \times \frac{4}{7} \right)$$

$$\text{viii)} \quad \frac{16}{25} \times 0 = 0$$

ix) Not defined

$$\text{x)} \quad 1, -1$$

$$\text{xi)} \quad 2^2$$

$$\text{xii)} \quad 1$$

xiii) negative

8. No,

$$\frac{4}{5} \times \left(-1\frac{1}{4}\right)$$

$$\frac{4}{5} \times \left(-\frac{5}{4}\right)$$

$$-1 \neq 1$$

$\therefore -1\frac{1}{4}$ is not multiplicative inverse of $\frac{4}{5}$

\therefore multiplicative inverse of $\frac{4}{5}$ should be $\frac{5}{4}$

9.

i. $\left\{\frac{7}{5} \times \left(-\frac{3}{12}\right)\right\} + \left\{\frac{7}{5} + \frac{5}{12}\right\}$

$$\frac{7}{5} \times \left\{-\frac{3}{12} + \frac{5}{12}\right\} \quad (\because \text{distributive property})$$

$$\frac{7}{5} \times \left\{\frac{-3+5}{12}\right\}$$

$$\frac{7}{5} \times \frac{2}{12}$$

$$\frac{7}{30}$$

ii) $\left\{\frac{9}{16} \times \frac{4}{12}\right\} + \left\{\frac{9}{16} \times \left(-\frac{3}{9}\right)\right\}$

$$\frac{9}{16} \times \left\{\frac{4}{12} + \left(-\frac{3}{9}\right)\right\} \quad (\because \text{distributive property})$$

$$\frac{9}{16} \times \left\{\frac{1}{3} + \left(-\frac{1}{3}\right)\right\}$$

$$\frac{9}{16} \left\{\frac{1}{3} - \frac{1}{3}\right\}$$

$$\frac{9}{16} \times 0 = \underline{0}$$

10. Additive inverse of 9 = -9

27

Multiplicative inverse of 9 = $\frac{1}{9}$

$$\begin{aligned}\text{Required sum} &= -9 + \frac{1}{9} \\ &= -\frac{81+1}{9} \\ &= -\frac{80}{9}\end{aligned}$$

$$\text{Required sum} = -8\frac{8}{9}$$

11. Additive inverse of $-\frac{2}{7}$ = $\frac{2}{7}$

Multiplicative inverse of $-\frac{2}{7}$ = $-\frac{7}{2}$

Required product = $\frac{2}{7} \times -\frac{7}{2}$

$$= -1$$

Exercise 1.4

28

$$i) \quad -\frac{3}{7} \div 4$$

$$-\frac{3}{7} \div \frac{4}{1}$$

$$-\frac{3}{7} \times \frac{1}{4}$$

$$\frac{-3 \times 1}{7 \times 4}$$

$$\frac{-3}{28}$$

ii)

$$4\frac{5}{8} \div \left(-\frac{4}{9}\right)$$

$$\frac{37}{8} \div \left(-\frac{4}{9}\right)$$

$$\frac{37}{8} \times \left(\frac{9}{-4}\right)$$

$$\frac{37 \times 9}{8 \times (-4)}$$

$$-\frac{333}{32}$$

$$-10\frac{13}{32}$$

iii)

$$-\frac{8}{9} \div -\frac{3}{5}$$

$$-\frac{8}{9} \times \frac{5}{-3}$$

$$\frac{-8 \times 5}{9 \times -3}$$

$$\frac{-40}{-27}$$

$$\frac{40}{27} = 1\frac{13}{27}$$

28

Q2.

- i. True
- ii. False
- iii. False
- iv. True
- v. True
- vi. False

3. let unknown number be 'x'

$$x \times 2 \frac{4}{9} = \frac{-11}{12}$$

$$x \times \frac{22}{9} = \frac{-11}{12}$$

$$x = \frac{-11}{12} \div \frac{22}{9}$$

$$= \frac{-11}{12} \times \frac{9}{22}$$

$$x = \frac{-3}{8}$$

Q3.

Other number = $\frac{-3}{8}$

4.

let unknown number be 'x'

$$x \times \left(\frac{-7}{12}\right) = \frac{5}{14}$$

$$x = \frac{5}{14} \div \left(\frac{-7}{12}\right)$$

$$= \frac{5}{14} \times \frac{12}{-7}$$

$$= \frac{5 \times 12}{14 \times (-7)}$$

$$= \frac{60}{-98}$$

$$= \underline{\underline{-\frac{30}{49}}}$$

5. Let unknown number be x

30

$$\frac{-3}{x} = \frac{-9}{13}$$

$$x = \frac{-3}{1} \div \left(\frac{-9}{13}\right)$$

$$= \frac{-3}{1} \times \frac{13}{-9}$$

$$\boxed{x = \frac{13}{3}} = 4\frac{1}{3}$$

6.

$$\text{Sum of numbers} = \frac{-13}{8} + \frac{5}{12}$$

$$= \frac{(-13 \times 3) + (5 \times 2)}{24} \quad \text{LCM of 8, 12} = 24$$

$$= \frac{-39 + 10}{24}$$

$$= \frac{-29}{24} \quad \frac{-29}{24}$$

Sum of numbers

$$\frac{-29}{24}$$

$$\text{Difference of numbers} = \frac{-13}{8} - \frac{5}{12}$$

$$= \frac{(-13 \times 3) - (5 \times 2)}{24}$$

$$= \frac{-39 - 10}{24}$$

Difference of numbers

$$= \frac{-49}{24}$$

$$\text{Required product} = \frac{\text{Sum of numbers}}{\text{Difference of numbers}}$$

$$= \frac{-29}{24} \div \left(\frac{-49}{24}\right)$$

$$= \frac{-29}{24} \times \frac{24}{-49}$$

$$= \frac{29}{49}$$

7.

$$\begin{aligned} \text{Sum of two numbers} &= \frac{8}{3} + \frac{4}{7} \\ &= \frac{(8 \times 7) + (3 \times 4)}{21} \quad \text{LCM of } 3 \text{ and } 7 = 21 \\ &= \frac{56 + 12}{21} \\ \text{Sum of two numbers} &= \frac{68}{21} \end{aligned}$$

$$\begin{aligned} \text{Product of given numbers} &= \frac{-3}{7} \times \frac{14}{9} \\ &= \frac{-2}{3} \end{aligned}$$

$$\begin{aligned} \text{Required product} &= \frac{\text{Sum of } \frac{8}{3} \text{ and } \frac{4}{7}}{\text{Product of } \frac{-3}{7} \text{ and } \frac{14}{9}} \end{aligned}$$

$$\begin{aligned} &= \frac{68}{21} \div \left(\frac{-2}{3}\right) \\ &= \frac{68}{21} \times \frac{3}{-2} \\ &= \frac{-34}{7} \end{aligned}$$

8.

$$\text{Given } p = \frac{-3}{2}, q = \frac{4}{5}, r = \frac{-7}{12}$$

$$(p \div q) \div r = p \div (q \div r)$$

$$\text{L.H.S} = (p \div q) \div r$$

$$= \left(\frac{-3}{2} \div \frac{4}{5}\right) \div \left(\frac{-7}{12}\right)$$

$$= \left(\frac{-3}{2} \times \frac{5}{4}\right) \div \left(\frac{-7}{12}\right)$$

$$= \left(\frac{-15}{8}\right) \div \left(\frac{-7}{12}\right)$$

$$= \frac{-15}{8} \times \frac{12}{-7}$$

$$= \frac{-15}{8} \times \frac{12}{-7}$$

$$\text{L.H.S} = +\frac{45}{7}$$

$$\text{R.H.S} = p \div (q \div r)$$

$$= \frac{-3}{2} \div \left(\frac{4}{5} \div \left(\frac{-7}{12} \right) \right)$$

$$= \frac{-3}{2} \div \left(\frac{4}{5} \times \frac{12}{-7} \right)$$

$$= \frac{-3}{2} \div \left(\frac{48}{-35} \right)$$

$$= \frac{-3}{2} \times \frac{-35}{48}$$

$$\text{R.H.S} = \frac{35}{32}$$

$$\text{L.H.S} \neq \text{R.H.S}$$

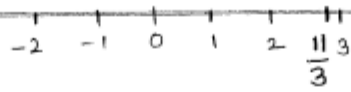
$$(p \div q) \div r \neq p \div (q \div r)$$

Exercise 1.5

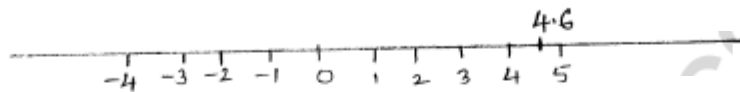
33

1.

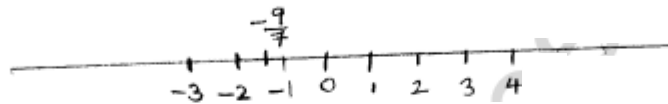
i. $\frac{11}{4} = 2.75$



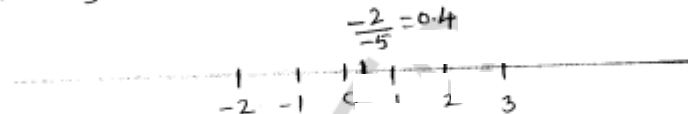
ii) $4\frac{3}{5} = \frac{23}{5} = 4.6$



iii) $-\frac{9}{7} = -1\frac{2}{7}$



iv) $\frac{-2}{-5} = \frac{2}{5} = 0.4$



2.

i)

$$A = \frac{3}{7}$$

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

$$C = \frac{8}{7}$$

$$D = \frac{12}{7}$$

$$E = \frac{13}{7}$$

ii)

$$P = -\frac{3}{8}$$

$$Q = -\frac{4}{8} = -\frac{1}{2}$$

$$R = -\frac{7}{8}$$

$$S = -\frac{11}{8}$$

$$T = -\frac{12}{8} = -\frac{3}{2}$$

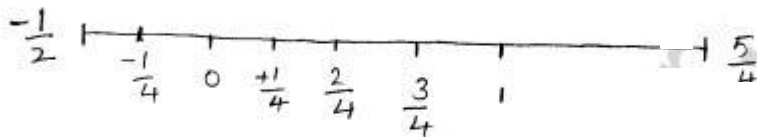
3.

34

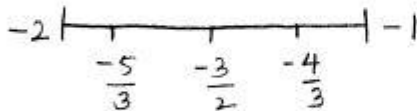
$$-\frac{3}{7}, -\frac{2}{7}, -\frac{1}{4}, -\frac{1}{7}, 0, \frac{1}{7}, \frac{1}{4}, \frac{2}{7}, \frac{3}{7}, \frac{1}{2}, \frac{4}{7}$$

$$\begin{aligned} & \rightarrow -\frac{3}{7}, -\frac{3}{10}, -\frac{5}{20}, -\frac{2}{10}, -\frac{3}{20}, -\frac{1}{10}, -\frac{1}{20}, 0, \frac{1}{20}, \frac{1}{10}, \frac{3}{20}, \frac{2}{10}, \frac{5}{20}, \frac{3}{10} \\ & \qquad \qquad \qquad \frac{7}{20}, \frac{4}{10}, \frac{9}{20}, \frac{5}{10}, \frac{11}{20}, \frac{6}{10}, \frac{2}{3} \end{aligned}$$

4)



5)



6)

1, 2, 3, 4, 5, 6, 7, 8, 9, 10

7)

 $-5, -6, -7, -8, -9$

8)

$-\frac{7}{3}$, Numerator is greater than denominator (Numerically)

$$-\frac{7}{3} < -1 ; -\frac{5}{11} < -\frac{1}{2}, -\frac{4}{9} > -1.$$

$\therefore -\frac{7}{3}$ is different among all four rational numbers

1.

$$\text{Total fruits} = 20 \text{ kg}$$

$$\text{Oranges} = 7\frac{1}{6} \text{ kg}$$

$$\text{Apples} = 8\frac{2}{3} \text{ kg}$$

$$\text{Let grapes} = x$$

$$7\frac{1}{6} + 8\frac{2}{3} + x = 20$$

$$\frac{43}{6} + \frac{26}{3} + x = 20$$

$$\frac{(43 \times 1) + (26 \times 2)}{6} + x = 20$$

$$\frac{43 + 52}{6} + x = 20$$

$$\frac{95}{6} + x = 20$$

$$x = 20 - \frac{95}{6}$$

$$x = \frac{120 - 95}{6}$$

$$x = \frac{25}{6} \text{ kg}$$

∴ Bag contain $4\frac{1}{6}$ kg of grapes.

2.

$$\text{Total population of city} = 6,63,432$$

$$\text{Adult male} = \frac{1}{2} \text{ of total population}$$

$$\text{Adult females} = \frac{1}{3} \text{ of total population}$$

$$\therefore \text{Adult male} + \text{Adult females} + \text{children} = \text{Total city}$$

$$\frac{1}{2} (6,63,432) + \frac{1}{3} (6,63,432) + \text{children} = 6,63,432$$

$$\frac{5}{6} (6,63,432) + \text{children} = 6,63,432$$

$$\text{children} = 6,63,432 \left(1 - \frac{5}{6}\right)$$

$$= 663432 \times \frac{1}{6}$$

$$\text{Children} = 110572$$

$$\therefore \text{no. of children in city} = 110,572$$

3.

$$\text{Total votes} = 30$$

$$\text{no. of votes for Mr. X} = \frac{2}{5} \text{ of } 30 = \frac{2}{5}(30)$$

$$\text{no. of votes for Mr. Z} = \frac{1}{3} \text{ of } 30 = \frac{1}{3}(30)$$

$$\text{let Mr. Y votes} = x$$

$$\therefore \frac{2}{5}(30) + x + \frac{1}{3}(30) = 30$$

$$12 + x + 10 = 30$$

$$x + 22 = 30$$

$$x = 30 - 22$$

$$x = 8$$

$$\text{no. of votes for Mr. Y} = 8$$

4.

$$\text{Total earnings} = ₹ 100$$

$$\text{Rupees spent on food} = ₹ 14 \frac{2}{7}$$

$$\text{Rupees spent on petrol} = ₹ 30 \frac{2}{3}$$

$$\text{let Savings on that day} = x$$

$$14 \frac{2}{7} + 30 \frac{2}{3} + x = 100$$

$$\frac{100}{7} + \frac{92}{3} + x = 100$$

$$\frac{(100 \times 3) + (92 \times 7)}{21} + x = 100$$

$$x = 100 - \frac{944}{21}$$

$$\therefore \text{Savings} = ₹ 55 \frac{1}{21}$$

$$x = \frac{1156}{21} = 55 \frac{1}{21}$$

5.

$$\text{Total Students} = 400$$

37

$$\text{no. of girls} = 130$$

$$\begin{aligned} \text{no. of boys appeared for exam} &= 400 - 130 \\ &= 270 \end{aligned}$$

$$\begin{aligned} \text{no. of boys passed in exam} &= \frac{2}{3}(270) \\ &= 180 \end{aligned}$$

$$\begin{aligned} \text{no. of boys failed in exam} &= \text{Total boys} - \text{passed boys} \\ &= 270 - 180 \\ &= 90 \end{aligned}$$

$$\therefore \text{no. of boys failed in exam} = 90.$$

6.

$$\text{Speed of Car} = 40 \frac{2}{3} \text{ km/h}$$

$$\text{time} = \frac{9}{10} \text{ hr}$$

$$\begin{aligned} \text{Distance travelled by Car} &= \text{Speed} \times \text{time} \\ &= 40 \frac{2}{3} \times \frac{9}{10} \\ &= \frac{122}{3} \times \frac{9}{10} \\ &= \frac{183}{5} \\ &= 36 \frac{3}{5} \text{ km} \end{aligned}$$

7.

$$\text{Side of Square} = 5 \frac{1}{9} \text{ m}$$

$$s = \frac{52}{9} \text{ m}$$

$$\begin{aligned} \text{Area of Square} &= s^2 \\ &= \frac{52}{9} \times \frac{52}{9} \\ &= \frac{2704}{81} \end{aligned}$$

$$\text{Area of Square} = 33 \frac{31}{81} \text{ m}^2$$

8.

$$\text{Perimeter of rectangle} = 15\frac{3}{7} \text{ m}$$

$$\text{length of rectangle (l)} = 4\frac{2}{7} \text{ m}$$

$$\text{perimeter} = 2(l+b)$$

$$15\frac{3}{7} = 2(4\frac{2}{7} + b)$$

$$\frac{108}{7} = 2\left(\frac{30}{7} + b\right)$$

$$\frac{30}{7} + b = \frac{108}{7 \times 2}$$

$$\frac{30}{7} + b = \frac{54}{7}$$

$$b = \frac{24}{7} - \frac{30}{7}$$

$$b = \frac{24}{7}$$

$$b = 3\frac{3}{7} \text{ m}$$

$$\text{breadth of rectangle} = 3\frac{3}{7} \text{ m.}$$

9.

$$\text{Total length of rope} = 325\frac{4}{5} \text{ m}$$

Rahul cut down

$$\text{Rahul cut of } 150\frac{3}{5} \text{ m of rope}$$

$$\therefore \text{Remaining length of rope} = 325\frac{4}{5} - 150\frac{3}{5}$$

$$= \frac{1629}{5} - \frac{753}{5}$$

$$= \frac{876}{5} \text{ m}$$

Rahul made Remaining rope into 3 equal parts

$$\therefore \text{length of each part} = \frac{876}{5} \div \frac{3}{1}$$

$$= \frac{876}{5} \times \frac{1}{3} = \frac{292}{5} = 58\frac{2}{5} \text{ m}$$

$$\therefore \text{length of each part} = 58\frac{2}{5} \text{ m.}$$

10. $3\frac{1}{2}$ liters of petrol cost = ₹ $270\frac{3}{8}$

$$\begin{aligned} \text{Cost for 1 liter of petrol} &= \frac{270\frac{3}{8}}{3\frac{1}{2}} \\ &= \frac{2163}{8} \times \frac{2}{7} \end{aligned}$$

$$\text{Cost for 1 liter of petrol} = \frac{309}{4}$$

$$\text{Cost for 4 liters of petrol} = \frac{309}{4} \times 4$$

$$\therefore \text{Cost for 4 liters of petrol} = ₹ 309$$

11.

$$\text{₹ Ramesh total earnings} = ₹ 40,000$$

$$\begin{aligned} \text{Ramesh spends } \frac{3}{8} \text{ of income on food} &= \frac{3}{8} \times 40,000 \\ &= 15,000 \end{aligned}$$

$$\begin{aligned} \text{Remaining money} &= 40,000 - 15,000 \\ &= 25,000 \end{aligned}$$

$$\begin{aligned} \text{Ramesh spends } \frac{1}{5} \text{ of remaining on LIC} \\ &= \frac{1}{5} (25,000) \\ &= 5,000 \end{aligned}$$

$$\begin{aligned} \text{Remaining money} &= 25,000 - 5,000 \\ &= 20,000 \end{aligned}$$

$$\text{Other expenses are } \frac{1}{2} \text{ of remaining money}$$

$$= \frac{1}{2} \times 20,000$$

$$= 10,000/-$$

$$\text{Remaining money} = 20,000 - 10,000$$

$$= \underline{\underline{10,000/-}}$$

12.

Let total bill Amount as x

40

Amount paid A will be = $\frac{x}{2}$

Amount paid B, C, D will be = $x - \frac{x}{2}$
 $= \frac{x}{2}$

Given that bill is shared equally among Three

Let bill paid by each one = y

$$y + y + y = \frac{x}{2}$$

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

$$y = \frac{x}{6}$$

\therefore Each paid $\frac{1}{6}$ th of total bill.

13.

Given $\frac{1}{3}x$ Let total no. of Student $S = x$ no. of Students of school come by car = $\frac{2}{5}x$ no. of Students of school come by bus = $\frac{1}{4}x$ no. of Students of school come by walk = $x - \left(\frac{2}{5}x + \frac{1}{4}x\right)$

$$= x - \left(\frac{(2 \times 4) + (1 \times 5)}{20}x\right)$$

$$= x - \frac{13}{20}x$$

no. of Students of school come by
walk = $\frac{7}{20}x$

no. of Students of school come by walk on their own

$$= \frac{1}{3} \text{ of } \left(\frac{7}{20}x\right)$$

$$= \frac{7}{60}x$$

$$\therefore \frac{7}{60} \cdot x = 224$$

$$x = \frac{224}{1} \times \frac{60}{7}$$

$$x = 1920$$

\therefore Total Students in School = 1920

14.

Total Cost of Room = ₹ 60,000

Let Mother's Contribution = ₹ x

Elder Son Contribution = ₹ $\frac{3}{8}x$

Younger Son Contribution = ₹ $\frac{1}{2}x$

$$\therefore x + \frac{3}{8}x + \frac{1}{2}x = 60,000$$

$$\frac{(1 \times 8) + (3 \times 4) + (1 \times 4)}{8} \cdot x = 60,000$$

$$\frac{8+3+4}{8} \cdot x = 60,000$$

$$\frac{15}{8} \cdot x = 60,000$$

$$x = 60,000 \times \frac{8}{15}$$

$$x = 32,000$$

\therefore Mother's Contribution = ₹ 32,000

\therefore Elder Son's Contribution = $\frac{3}{8} \times 32,000 = ₹ 12,000/-$

\therefore Younger Son's Contribution = $\frac{1}{2} \times 32,000 = ₹ 16,000/-$

15.

Total Students = 56

let no. of girls = x no. of boys = $\frac{2}{5}x$

$$\therefore x + \frac{2}{5}x = 56$$

$$\frac{7}{5}x = 56$$

$$x = \frac{56}{1} \times \frac{5}{7}$$

$$x = 40$$

 \therefore no. of girls = 40

 \therefore no. of boys = $56 - 40 = 16$

16.

let the money possessed by man = $\text{₹ } x$
 $\frac{1}{10}$ of money donated to school = $\frac{x}{10}$
Remaining money = $x - \frac{x}{10} = \frac{9x}{10}$
 $\frac{1}{6}$ of remaining money to church = $\left(\frac{9x}{10}\right) \times \frac{1}{6}$

$$\begin{aligned} \text{Remaining money} &= \frac{9x}{10} - \frac{9x}{10 \times 6} \\ &= \frac{45x}{60} \end{aligned}$$

Now, the man distributed this money equally to his three sons and each one gets = 2 50,000

$$\frac{45x}{60} \div 3 = 50,000$$

$$\frac{45x}{60} \times \frac{1}{3} = 50,000$$

$$\frac{3x}{4} \times \frac{1}{3} = 50,000$$

$$x = 50,000 \times 4$$

$$x = 2,00,000/-$$

Man possessed originally
₹ 2,00,000

17. Let a number be 'x'

$\frac{1}{4}$ of a number is added to $\frac{1}{3}$ of number

$\frac{x}{4} + \frac{x}{3}$ is 15 greater than half of number

$$\frac{x}{4} + \frac{x}{3} = 15 + \frac{x}{2}$$

$$\frac{7x}{12} = 15 + \frac{x}{2}$$

$$\frac{7x}{12} - \frac{x}{2} = 15$$

$$\frac{x}{12} = 15$$

$$x = 15 \times 12$$

$$x = 180$$

18. Let the number be 'x'

$$\frac{x}{4} - \frac{x}{5} = 36 + \left(\frac{x+4}{5}\right)$$

$$\frac{5x}{4} = 36 + \frac{4x}{5}$$

$$\frac{5x}{4} - \frac{4x}{5} = 36$$

$$\frac{(5 \times 5) - (4 \times 4)}{20} \cdot x = 36$$

$$\frac{25-16}{20} \cdot x = 36$$

$$\frac{9}{20} \cdot x = 36$$

$$x = \frac{36}{9} \times 20$$

$$\boxed{x = 80}$$

\therefore The given number is 80