



### EXERCISE 1.1

#### 1. Add the following:

(i)  $4/7$  and  $5/7$

(ii)  $7/-13$  and  $4/-13$

#### Solution:

(i) Given

$$4/7 \text{ and } 5/7$$

Adding both the numbers

$$4/7 + 5/7 = (4 + 5)/7$$

We get,

$$= 9/7$$

∴ The addition of  $4/7$  and  $5/7$  is  $9/7$

(ii) Given

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

Consider

$$7/-13 = \{7 \times (-1)\} / \{-13 \times (-1)\}$$

$$= -7/13$$

Also,

$$4/-13 = \{4 \times (-1)\} / \{-13 \times (-1)\}$$

$$= -4/13$$

Now,

Adding both the numbers

$$(7/-13) + (4/-13) = (-7 - 4)/13$$

We get,

$$= -11/13$$

#### 2. Simplify:

(i)  $5/11 + 4\frac{3}{9}$

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

#### Solution:

(i) Given

$$5/11 + 4\frac{3}{9}$$

This can be written as,

$$5/11 + 39/9$$

Taking L.C.M we get,

$$5/11 = (5 \times 9) / (11 \times 9)$$



We get,  
 $= 45 / 99$

$$39 / 9 = (39 \times 11) / (9 \times 11)$$

We get,  
 $= 429 / 99$

Now,

Adding both the numbers,

$$45 / 99 + 429 / 99 = (45 + 429) / 99$$

$$= 474 / 99$$

99	474	4
	396	
	78	

$$= 4 \frac{78}{99}$$

Dividing numerator and denominator by 3,

$$= 4 (78 \div 3) / (99 \div 3)$$

We get,

$$= 4 \frac{26}{33}$$

(ii) Given

$$- 4 / 9 + 2 \frac{12}{13}$$

This can be written as,

$$- 4 / 9 + 38 / 13$$

Taking L.C.M we get,

$$- 4 / 9 = (-4 \times 13) / (9 \times 13)$$

We get,

$$= - 52 / 117$$

$$38 / 13 = (38 \times 9) / (13 \times 9)$$

We get,

$$= 342 / 117$$

Now,

Adding both the numbers,

$$- 52 / 117 + 342 / 117 = (- 52 + 342) / 117$$

We get,

$$= 290 / 117$$

117	290	2
	234	
	56	



**3. Verify commutative property of addition for the following pairs of rational numbers.**

**(i)  $-4/3$  and  $3/7$**

**(ii)  $-2/-5$  and  $1/3$**

**(iii)  $9/11$  and  $2/13$**

**Solution:**

**(i)  $-4/3$  and  $3/7$**

Adding both the numbers,

$$= -4/3 + 3/7$$

Taking L.C.M. we get,

$$= (-28 + 9) / 21$$

$$= -19 / 21$$

And

$$3/7 + (-4/3)$$

Again taking L.C.M. we get,

$$= (9 - 28) / 21$$

$$= -19 / 21$$

Therefore,

$$-4/3 + 3/7 = 3/7 + (-4/3)$$

**(ii)  $-2/-5$  and  $1/3$**

Consider,

$$-2/-5 = \{-2 \times (-1)\} / \{-5 \times (-1)\}$$

$$= 2/5$$

Now,

$$2/5 + 1/3$$

Taking L.C.M. we get,

$$= (6 + 5) / 15$$

$$= 11 / 15$$

And  $1/3 + 2/5$

Again taking L.C.M. we get,

$$= (5 + 6) / 15$$

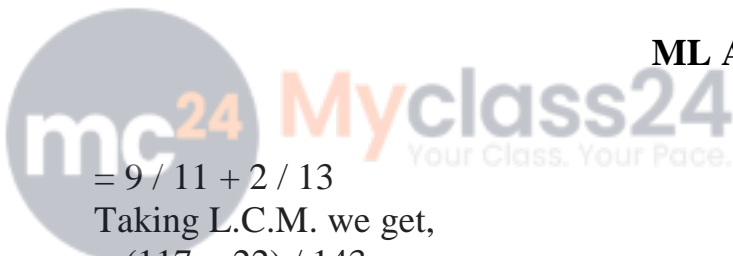
$$= 11 / 15$$

Therefore,

$$2/5 + 1/3 = 1/3 + 2/5$$

**(iii)  $9/11$  and  $2/13$**

Adding both the numbers,



$$= 9 / 11 + 2 / 13$$

Taking L.C.M. we get,

$$= (117 + 22) / 143$$

We get,

$$= 139 / 143$$

And  $2 / 13 + 9 / 11$

Again taking L.C.M. we get,

$$= (22 + 117) / 143$$

We get,

$$= 139 / 143$$

Therefore,

$$9 / 11 + 2 / 13 = 2 / 13 + 9 / 11$$

**4. Find the additive inverse of the following rational numbers:**

**(i)  $2 / - 3$**

**(ii)  $- 7 / - 12$**

**Solution:**

(i) Given

$$2 / - 3$$

Additive inverse of

$$2 / - 3 = - (2 / - 3)$$

We get,

$$= 2 / 3$$

(ii) Given

$$- 7 / - 12$$

Additive inverse of

$$- 7 / - 12 = - (- 7 / - 12)$$

We get,

$$= - 7 / 12$$

**5. Verify that  $- (- x) = x$  for**

**(i)  $x = 10 / 13$**

**(ii)  $x = - 15 / 17$**

**Solution:**

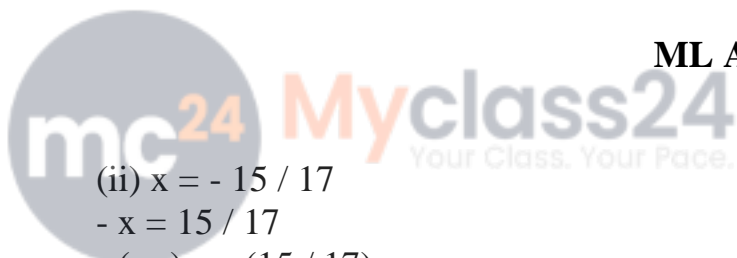
(i)  $x = 10 / 13$

$$- x = - 10 / 13$$

$$- (- x) = - (- 10 / 13)$$

$$= 10 / 13$$

Hence,  $- (- x) = x$



$$\begin{aligned} \text{(ii) } x &= -15/17 \\ -x &= 15/17 \\ -(-x) &= -(15/17) \\ &= -15/17 \end{aligned}$$

Hence,  $-(-x) = x$

**6. Using appropriate properties of addition, find the following:**

**(i)  $4/5 + 11/7 + (-7/5) + (-2/7)$**

**(ii)  $3/7 + 4/9 + (-5/21) + (2/3)$**

**Solution:**

$$\begin{aligned} \text{(i) } &4/5 + 11/7 + (-7/5) + (-2/7) \\ &= 4/5 + (-7/5) + 11/7 + (-2/7) \\ &= \{4 + (-7)\}/5 + \{11 + (-2)\}/7 \\ &= (4 - 7)/5 + (11 - 2)/7 \end{aligned}$$

On further calculation, we get,

$$= -3/5 + 9/7$$

Now, taking L.C.M. we get,

$$= (-21 + 45)/35$$

$$= 24/35$$

$$\text{(ii) } 3/7 + 4/9 + (-5/21) + 2/3$$

$$= 3/7 + (-5/21) + 4/9 + 2/3$$

On simplifying, we get,

$$= \{9 + (-5)\}/21 + (4 + 6)/9$$

$$= 4/21 + 10/9$$

Taking L.C.M. we get,

$$= (12 + 70)/63$$

$$= 82/63$$

63	82	1
	63	
	19	

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

**7. Fill in the blanks:**

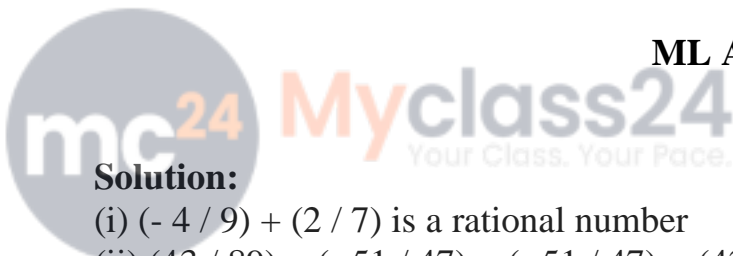
**(i)  $(-4/9) + (2/7)$  is a ..... number**

**(ii)  $(43/89) + (-51/47) = \dots\dots + (43/89)$**

**(iii)  $2/7 + \dots\dots = 2/7 = 0 + \dots\dots$**

**(iv)  $4/11 + \{(-7/12) + 9/10\} = \{(4/11) + (-7/12)\} + \dots\dots$**

**(v)  $5/9 + \dots\dots = 0 = (-5/9) + \dots\dots$**



**Solution:**

(i)  $(-4/9) + (2/7)$  is a rational number

(ii)  $(43/89) + (-51/47) = (-51/47) + (43/89)$  (Commutative property)

(iii)  $2/7 + 0 = 2/7 = 0 + 2/7$  (Commutative property)

(iv)  $4/11 + \{(-7/12) + 9/10\} = \{(4/11) + (-7/12)\} + 9/10$  (Associative property)

(v)  $5/9 + (-5/9) = 0 = (-5/9) + 5/9$  (Existence of zero property)

**8. If  $a = -11/27$ ,  $b = 4/9$  and  $c = -5/18$ , then verify that  $a + (b + c) = (a + b) + c$**

**Solution:**

Given

$a = -11/27$ ,  $b = 4/9$  and  $c = -5/18$

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

Consider,

L.H.S. =  $a + (b + c)$

=  $-11/27 + \{4/9 + (-5/18)\}$

=  $-11/27 + (4/9 - 5/18)$

On simplification, we get

=  $-11/27 + (8 - 5)/18$

=  $-11/27 + 3/18$

Taking L.C.M. we get,

=  $(-22 + 9)/54$

=  $-13/54$

R.H.S. =  $(a + b) + c$

=  $(-11/27 + 4/9) + (-5/18)$

On further calculation, we get

=  $\{(-11 + 12)/27\} + (-5/18)$

=  $(1/27) + (-5/18)$

=  $(2 - 15)/54$

=  $-13/54$

Hence,

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

EXERCISE 1.2

1. Subtract:

(i)  $2\frac{3}{5}$  from  $-3/7$

(ii)  $-4/9$  from  $3\frac{5}{8}$

(iii)  $-3\frac{1}{5}$  from  $-4\frac{7}{9}$

Solution:

(i)  $2\frac{3}{5}$  from  $-3/7$   
 $= -3/7 - (13/5)$

Taking L.C.M. we get,

$= (-15 - 91) / 35$

$= -106 / 35$

35	106	3
	105	
	1	

$= -3\frac{1}{35}$

Hence, the subtraction of  $2\frac{3}{5}$  from  $-3/7$  is  $-3\frac{1}{35}$

(ii)  $-4/9$  from  $3\frac{5}{8}$

This can be written as,

$-4/9$  from  $29/8$

$= 29/8 - (-4/9)$

$= 29/8 + 4/9$

Taking L.C.M. we get,

$= (261 + 32) / 72$

$= 293 / 72$

72	293	4
	288	
	5	

$= 4\frac{5}{72}$

(iii)  $-3\frac{1}{5}$  from  $-4\frac{7}{9}$

This can be written as,



$$= -16/5 \text{ from } -43/9$$

$$= -43/9 - (-16/5)$$

$$= -43/9 + 16/5$$

Taking L.C.M. we get,

$$= (-215 + 144) / 45$$

We get,

$$= -71/45$$

45	71	1
	45	
	26	

$$= -1\frac{26}{45}$$

**2. Sum of two rational numbers is  $3/5$ . If one of them is  $-2/7$ , find the other.**

**Solution:**

Given

Sum of two rational numbers is  $3/5$

One of the number is  $-2/7$

Hence, the other number is calculated as follows:

$$\text{Other number} = 3/5 - (-2/7)$$

$$= 3/5 + 2/7$$

Taking L.C.M. we get,

$$= (21 + 10) / 35$$

$$= 31 / 35$$

Therefore, the other number is  $31/35$

**3. What rational number should be added to  $-5/11$  to get  $-7/8$ ?**

**Solution:**

Given

According to the statement,

Sum of two numbers =  $-7/8$

One number =  $-5/11$

Hence, the other number is calculated as below:

$$\text{Other number} = -7/8 - (-5/11)$$

$$= -7/8 + 5/11$$

Taking L.C.M. we get,

$$= (-77 + 40) / 88$$

$$= -37 / 88$$

Therefore, the other number is  $-37/88$

4. What rational number should be subtracted from  $-4\frac{3}{5}$  to get  $-3\frac{1}{2}$  ?

**Solution:**

The required number can be calculated as follows:

$$\left(-4\frac{3}{5}\right) - \left(-3\frac{1}{2}\right)$$

This can be written as,

$$\left(-\frac{23}{5}\right) + \left(\frac{7}{2}\right)$$

On further calculation, we get

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

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

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

Therefore, the required number is  $-1\frac{1}{10}$

5. Subtract the sum of  $-5/7$  and  $-8/3$  from the sum of  $5/2$  and  $-11/12$ .

**Solution:**

Sum of  $-5/7$  and  $-8/3$  can be calculated as,

$$-5/7 \text{ and } -8/3 = \left(-5/7\right) + \left(-8/3\right)$$

On further calculation, we get

$$= \frac{-15 - 56}{21}$$

$$= -71/21$$

Now,

Sum of  $5/2$  and  $-11/12$  can be calculated as,

$$5/2 + \left(-11/12\right) = 5/2 - 11/12$$

On simplification, we get,

$$= \frac{30 - 11}{12}$$

$$= 19/12$$

Now,

$$19/12 - \left(-71/21\right)$$

$$= 19/12 + 71/21$$

Taking L.C.M. we get,

$$= \frac{133 + 284}{84}$$

$$= 417/84$$

84	417	4
	336	
	81	



$$= 4\frac{81}{84}$$

$$= 4\frac{27}{28}$$

6. If  $x = -4/7$  and  $y = 2/5$ , then verify that  $x - y \neq y - x$

**Solution:**

Given

$$x = -4/7 \text{ and } y = 2/5$$

Now,

$$x - y = -4/7 - (2/5)$$

$$= -4/7 - 2/5$$

Taking L.C.M. we get,

$$= (-20 - 14) / 35$$

$$= -34 / 35$$

And

$$y - x = 2/5 - (-4/7)$$

$$= 2/5 + 4/7$$

Taking L.C.M. we get,

$$= (14 + 20) / 35$$

$$= 34 / 35$$

Therefore,  $x - y \neq y - x$

7. If  $x = 4/9$ ,  $y = -7/12$  and  $z = -2/3$ , then verify that  $x - (y - z) \neq (x - y) - z$

**Solution:**

Given

$$x = 4/9, y = -7/12, z = -2/3$$

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

$$\text{L.H.S.} = x - (y - z)$$

$$= 4/9 - \{-7/12 - (-2/3)\}$$

$$= 4/9 - (-7/12 + 2/3)$$

On further calculation, we get

$$= 4/9 - \{(-7 + 8) / 12\}$$

$$= 4/9 - (1 / 12)$$

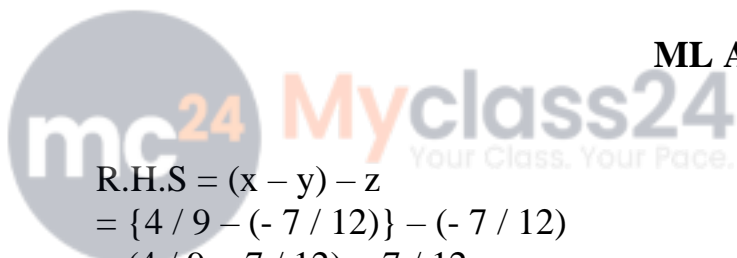
$$= 4/9 - 1 / 12$$

Taking L.C.M. we get,

$$= (16 - 3) / 36$$

$$= 13 / 36$$

Now,



$$\begin{aligned} \text{R.H.S} &= (x - y) - z \\ &= \left\{ \frac{4}{9} - \left(-\frac{7}{12}\right) \right\} - \left(-\frac{7}{12}\right) \\ &= \left(\frac{4}{9} + \frac{7}{12}\right) + \frac{7}{12} \end{aligned}$$

On further calculation, we get

$$\begin{aligned} &= \left\{ \frac{(16 + 21)}{36} \right\} + \frac{7}{12} \\ &= \frac{37}{36} + \frac{7}{12} \end{aligned}$$

Again taking L.C.M. we get,

$$\begin{aligned} &= \frac{(37 + 21)}{36} \\ &= \frac{58}{36} \end{aligned}$$

Therefore,  $x - (y - z) \neq (x - y) - z$

**8. Which of the following statement is true / false?**

- (i)  $\frac{2}{3} - \frac{4}{5}$  is not a rational number.**
- (ii)  $-\frac{5}{7}$  is the additive inverse of  $\frac{5}{7}$ .**
- (iii) 0 is the additive inverse of its own.**
- (iv) Commutative property holds for subtraction of rational numbers.**
- (v) Associative property does not hold for subtraction of rational numbers.**
- (vi) 0 is the identity element for subtraction of rational numbers.**

**Solution:**

$$\begin{aligned} \text{(i)} \quad &\frac{2}{3} - \frac{4}{5} \\ \text{Taking L.C.M} \\ &= \frac{(10 - 12)}{15} \\ &= -\frac{2}{15} \end{aligned}$$

Is a rational number

Hence, the given statement is **false**

**(ii)** The given statement is **true**

**(iii)** The given statement is **true**

**(iv)** Let us take,

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

We know that,

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

$$\frac{2}{4} \neq -\frac{2}{4}$$

Therefore, the given statement is **false**

**(v)** The given statement is **true**

**(vi)** Let us take,

$$\frac{7}{8} - 0 = \frac{7}{8}$$

$$\text{But } 0 - \frac{7}{8} = -\frac{7}{8}$$

$$\frac{7}{8} \neq -\frac{7}{8}$$

Therefore, the given statement is **false**



### EXERCISE 1.3

1. Multiply and express the result in the lowest form:

(i)  $6 / - 7 \times 14 / 30$

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

(iii)  $25 / - 9 \times - 3 / 10$

**Solution:**

(i)  $6 / - 7 \times 14 / 30$   
 $= (6 \times 14) / (- 7 \times 30)$

We get,

$= 84 / - 210$   
 $= (84 \div 42) / (- 210 \div 42)$   
 $\because$  HCF of 84, 210 = 42  
 $= 2 / - 5$   
 $= \{2 \times (- 1)\} / \{- 5 \times (- 1)\}$   
 $= - 2 / 5$

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

This can be written as,

$= 20 / 3 \times 9 / 7$   
 $= (20 \times 9) / (3 \times 7)$   
 $= 180 / 21$   
 $= (180 \div 3) / (21 \div 3)$   
 $\because$  HCF of 180, 21 = 3

We get,

$= 60 / 7$   
 $= 8\frac{4}{7}$

(iii)  $25 / - 9 \times - 3 / 10$

$= \{25 \times (- 3)\} / \{(- 9) \times 10\}$   
 $= - 75 / - 90$   
 $= \{- 75 \div (- 15)\} / \{- 90 \div (- 15)\}$   
 $\because$  HCF of 75, 90 = 15

We get,

$= 5 / 6$

2. Verify commutative property of multiplication for the following pairs of rational numbers:

(i)  $4 / 5$  and  $- 7 / 8$



(ii)  $13\frac{1}{3}$  and  $1\frac{1}{8}$

(iii)  $-7 / -20$  and  $5 / -14$

**Solution:**

(i)  $4 / 5$  and  $-7 / 8$

Now,

$$\begin{aligned} &4 / 5 \times -7 / 8 \\ &= \{4 \times (-7)\} / 5 \times 8 \end{aligned}$$

We get,

$$= -28 / 40$$

and

$$\begin{aligned} &-7 / 8 \times 4 / 5 \\ &= (-7 \times 4) / (8 \times 5) \end{aligned}$$

We get,

$$= -28 / 40$$

Therefore,  $4 / 5 \times (-7 / 8) = -7 / 8 \times 4 / 5$

(ii)  $13\frac{1}{3}$  and  $1\frac{1}{8}$

This can be written as,

$40 / 3$  and  $9 / 8$

Now,

$$\begin{aligned} &40 / 3 \times 9 / 8 \\ &= (40 \times 9) / (3 \times 8) \\ &= 360 / 24 \end{aligned}$$

We get,

$$= 15$$

and

$$\begin{aligned} &9 / 8 \times 40 / 3 \\ &= (9 \times 40) / (8 \times 3) \\ &= 360 / 24 \end{aligned}$$

We get,

$$= 15$$

Therefore,  $40 / 3 \times 9 / 8 = 9 / 8 \times 40 / 3$

(iii)  $-7 / -20$  and  $5 / -14$

$$\begin{aligned} &-7 / -20 = \{-7 \times (-1)\} / \{-20 \times (-1)\} \\ &= 7 / 20 \end{aligned}$$

Now,  $7 / 20$  and  $5 / -14$

$$\begin{aligned} &7 / 20 \times 5 / -14 \\ &= (7 \times 5) / 20 \times (-14) \end{aligned}$$



$$= 35 / - 280$$

and

$$5 / - 14 \times 7 / 20$$

$$= (5 \times 7) / (- 14 \times 20)$$

$$= 35 / - 280$$

Therefore,  $7 / 20 \times 5 / - 14 = 5 / - 14 \times 7 / 20$

**3. Verify the following and name the property also:**

**(i)  $3 / 5 \times (- 4 / 7 \times - 8 / 9) = (3 / 5 \times - 4 / 7) \times - 8 / 9$**

**(ii)  $5 / 9 \times (- 3 / 2 + 7 / 5) = 5 / 9 \times - 3 / 2 + 5 / 9 \times 7 / 5$**

**Solution:**

**(i)  $3 / 5 \times (- 4 / 7 \times - 8 / 9) = (3 / 5 \times - 4 / 7) \times - 8 / 9$**

L.H.S. =  $3 / 5 \times (- 4 / 7 \times - 8 / 9)$

$$= 3 / 5 \times (- 4 \times - 8) / 7 \times 9$$

$$= 3 / 5 \times 32 / 63$$

$$= (3 \times 32) / (5 \times 63)$$

We get,

$$= 96 / 315$$

R.H.S. =  $(3 / 5 \times - 4 / 7) \times - 8 / 9$

$$= - 12 / 35 \times - 8 / 9$$

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

We get,

$$= 96 / 315$$

Hence,  $3 / 5 \times (- 4 / 7 \times - 8 / 9) = (3 / 5 \times - 4 / 7) \times - 8 / 9$

The name of the property is Associative property of multiplication

**(ii)  $5 / 9 \times (- 3 / 2 + 7 / 5) = 5 / 9 \times - 3 / 2 + 5 / 9 \times 7 / 5$**

L.H.S =  $5 / 9 \times (- 3 / 2 + 7 / 5)$

$$= 5 / 9 \times \{(- 15 + 14) / 10\}$$

We get,

$$= 5 / 9 \times (- 1 / 10)$$

$$= - 5 / 90$$

$$= (- 5 \div 5) / (90 \div 5)$$

We get,

$$= - 1 / 18$$

R.H.S. =  $5 / 9 \times (- 3 / 2) + 5 / 9 \times 7 / 5$

On further calculation, we get,

$$= - 15 / 18 + 35 / 45$$

Taking L.C.M. we get,

$$= (- 75 + 70) / 90$$



$$= -5 / 90$$

$$= (-5 \div 5) / (90 \div 5)$$

$$= -1 / 18$$

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

**4. Find the multiplication inverse of the following:**

(i) 12

(ii)  $2 / 3$

(iii)  $-4 / 7$

(iv)  $-3 / 8 \times (-7 / 13)$

**Solution:**

(i) The multiplication inverse of 12 is  $1 / 12$

(ii) The multiplication inverse of  $2 / 3$  is  $3 / 2$

(iii) The multiplication inverse of  $-4 / 7$  is  $7 / -4$

(iv)  $-3 / 8 \times (-7 / 13) = 21 / 104$

The multiplication inverse of  $21 / 104$  is  $104 / 21 = 4 \frac{20}{21}$

**5. Using the appropriate properties of operations of rational numbers, evaluate the following:**

(i)  $2 / 5 \times -3 / 7 - 1 / 14 - 3 / 7 \times 3 / 5$

(ii)  $8 / 9 \times 4 / 5 + 5 / 6 - 9 / 5 \times 8 / 9$

(iii)  $-3 / 7 \times 14 / 15 \times 7 / 12 \times (-30 / 35)$

**Solution:**

(i)  $2 / 5 \times -3 / 7 - 1 / 14 - 3 / 7 \times 3 / 5$

$$= 2 / 5 \times -3 / 7 - 3 / 7 \times 3 / 5 - 1 / 14$$

Taking common term, we get

$$= -3 / 7 (2 / 5 + 3 / 5) - 1 / 14$$

$$= -3 / 7 \times (2 + 3) / 5 - 1 / 14$$

$$= -3 / 7 \times 1 - 1 / 14$$

$$= -3 / 7 - 1 / 14$$

Taking L.C.M. we get,

$$= (-6 - 1) / 14$$

$$= -7 / 14$$

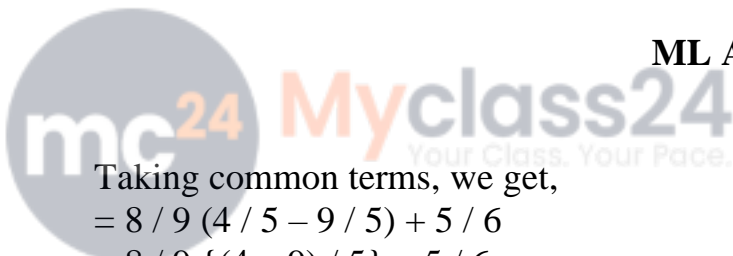
$$= (-7 \div 7) / (14 \div 7)$$

We get,

$$= -1 / 2$$

(ii)  $8 / 9 \times 4 / 5 + 5 / 6 - 9 / 5 \times 8 / 9$

$$= 8 / 9 \times 4 / 5 - 9 / 5 \times 8 / 9 + 5 / 6$$



Taking common terms, we get,

$$= \frac{8}{9} \left( \frac{4}{5} - \frac{9}{5} \right) + \frac{5}{6}$$

$$= \frac{8}{9} \left\{ \frac{(4 - 9)}{5} \right\} + \frac{5}{6}$$

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

$$= \frac{8}{9} \times (-1) + \frac{5}{6}$$

On further calculation, we get

$$= -\frac{8}{9} + \frac{5}{6}$$

Taking L.C.M. we get,

$$= \frac{(-16 + 15)}{18}$$

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

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

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

On further calculation, we get

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

We get,

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

**6. If  $p = -\frac{8}{27}$ ,  $q = \frac{3}{4}$  and  $r = -\frac{12}{15}$ , then verify that**

**(i)  $p \times (q \times r) = (p \times q) \times r$**

**(ii)  $p \times (q - r) = p \times q - p \times r$**

**Solution:**

Given

$$p = -\frac{8}{27}, q = \frac{3}{4} \text{ and } r = -\frac{12}{15}$$

**(i)  $p \times (q \times r) = (p \times q) \times r$**

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

$$= -\frac{8}{27} \times \left(\frac{3}{4} \times -\frac{12}{15}\right)$$

$$= -\frac{8}{27} \times -\frac{3}{5}$$

On further calculation, we get,

$$= \frac{(-8) \times (-3)}{(27 \times 5)}$$

$$= \frac{24}{(27 \times 5)}$$

We get,

$$= \frac{8}{45}$$

Now,

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

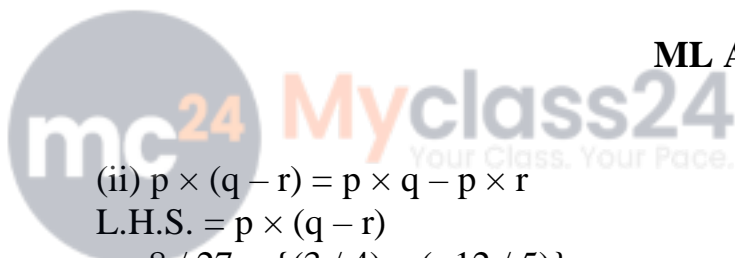
$$= \left(-\frac{8}{27} \times \frac{3}{4}\right) \times -\frac{12}{15}$$

$$= -\frac{2}{9} \times -\frac{12}{15}$$

We get,

$$= \frac{8}{45}$$

Therefore, L.H.S. = R.H.S.



$$(ii) p \times (q - r) = p \times q - p \times r$$

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

$$= -8/27 \times \{(3/4) - (-12/5)\}$$

Taking L.C.M. we get,

$$= -8/27 \times \{(45 + 48)/60\}$$

$$= -8/27 \times 93/60$$

We get,

$$= -62/135$$

$$\text{R.H.S.} = p \times q - p \times r$$

$$= -8/27 \times 3/4 - (8/27 \times -12/15)$$

$$= -2/9 - 32/135$$

$$= (-30 - 32)/135$$

We get,

$$= -62/135$$

Therefore, L.H.S. = R.H.S.

### 7. Fill in the following blanks:

(i)  $2/3 \times -4/5$  is a ..... number.

(ii)  $54/81 \times -63/108 = \dots \times 54/81$

(iii)  $4/5 \times 1 = \dots = 1 \times \dots$

(iv)  $5/-12 \times \dots = 1 = -12/5 \times \dots$

(v)  $3/7 \times (-2/8 \times \dots) = (3/7 \times -2/8) \times 5/9$

(vi)  $-8/9 \times \{4/13 + 5/17\} = -8/9 \times 4/13 + \dots$

(vii)  $-6/13 \times \{8/9 - 4/7\} = -6/13 \times \dots - (-6/13) \times (4/7)$

(viii)  $16/23 \times \dots = 0$

(ix) The reciprocal of 0 is .....

(x) The numbers ..... and ..... are their own reciprocals.

(xi) If y be the reciprocal of x, then the reciprocal of  $y^2$  in terms of x will be .....

(xii) The product of a non-zero rational number and its reciprocal is .....

(xiii) The reciprocal of a negative rational number is .....

**Solution:**

(i)  $2/3 \times -4/5$  is a rational number.

(ii)  $54/81 \times -63/108 = \dots \times 54/81$

$$54/81 \times -63/108 = -63/108 \times 54/81$$

(iii)  $4/5 \times 1 = \dots = 1 \times \dots$

$$4/5 \times 1 = 4/5 = 1 \times 4/5$$

(iv)  $5/-12 \times \dots = 1 = -12/5 \times \dots$

$$5/-12 \times -12/5 = 1 = -12/5 \times 5/-12$$

(v)  $3/7 \times (-2/8 \times \dots) = (3/7 \times -2/8) \times 5/9$

$$3/7 \times (-2/8 \times 5/9) = (3/7 \times -2/8) \times 5/9$$

$$(vi) -8/9 \times (4/13 + 5/17) = -8/9 \times 4/13 + \dots\dots\dots$$

$$-8/9 \times (4/13 + 5/17) = -8/9 \times 4/13 + -8/9 \times 5/17$$

$$(vii) -6/13 \times (8/9 - 4/7) = -6/13 \times \dots - (-6/13) \times (4/7)$$

$$-6/13 \times (8/9 - 4/7) = -6/13 \times 8/9 - (-6/13) \times (4/7)$$

$$(viii) 16/23 \times \dots = 0$$

$$16/23 \times 0 = 0$$

(ix) The reciprocal of 0 is not defined

(x) The numbers 1 and -1 are their own reciprocals

(xi) If y be the reciprocal of x, then the reciprocal of  $y^2$  in terms of x will be  $x^2$

(xii) The product of a non-zero rational number and its reciprocal is 1

(xiii) The reciprocal of a negative rational number is a negative rational number

**8. If  $4/5$  the multiplicative inverse of  $-1\frac{1}{4}$ ? Why or why not?**

**Solution:**

No, the multiplicative inverse of  $4/5$  is not  $-5/4$

The multiplicative inverse of  $4/5$  is  $5/4$

**9. Using distributivity, find**

(i)  $\{7/5 \times (-3/12)\} + \{7/5 + 5/12\}$

(ii)  $\{9/16 \times 4/12\} + \{9/16 \times (-3/9)\}$

**Solution:**

(i)  $\{7/5 \times (-3/12)\} + \{7/5 + 5/12\}$

Taking common factor, we get

$$= 7/5 \times (-3/12 + 5/12)$$

$$= 7/5 \times \{(-3 + 5)/12\}$$

$$= 7/5 \times 2/12$$

We get,

$$= 7/30$$

(ii)  $\{9/16 \times 4/12\} + \{9/16 \times (-3/9)\}$

Taking common factor, we get

$$= 9/16 \times \{4/12 + (-3/9)\}$$

$$= 9/16 \times (1/3 - 1/3)$$

We get,

$$= 9/16 \times 0$$

$$= 0$$

**10. Find the sum of additive inverse and multiplication inverse of 9.**



**Solution:**

The additive inverse of 9 is  $-9$

The multiplicative inverse of 9 is  $1/9$

Hence,

$$-9 + 1/9 = (-81 + 1)/9$$

We get,

$$= -80/9$$

$$= -8\frac{8}{9}$$

**11. Find the product of additive inverse and multiplicative inverse of  $-3/7$**

**Solution:**

The additive inverse of  $-3/7$  is  $3/7$

The multiplicative inverse of  $-3/7$  is  $-7/3$

Therefore,

$$3/7 \times (-7/3) = -1$$



**EXERCISE 1.4**

**1. Find the value of the following:**

(i)  $-3/7 \div 4$

(ii)  $4\frac{5}{8} \div (-4/9)$

(iii)  $-8/9 \div -3/5$

**Solution:**

(i)  $-3/7 \div 4$   
 $= -3/7 \times 1/4$

We get,  
 $= -3/28$

Hence, the value of  $-3/7 \div 4 = -3/28$

(ii)  $4\frac{5}{8} \div (-4/9)$

This can be written as,

$= 37/8 \div (-4/9)$   
 $= 37/8 \times 9/-4$

We get,  
 $= 333/-32$   
 $= \{333 \times (-1)\} / \{-32 \times (-1)\}$   
 $= -333/32$

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

(iii)  $-8/9 \div -3/5$

$= -8/9 \times 5/-3$

$= -40/-27$   
 $= \{-40 \times (-1)\} / \{-27 \times (-1)\}$

We get,  
 $= 40/27$

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

**2. State whether the following statements are true or false:**

(i)  $-9/13 \div 2/7$  is a rational number.

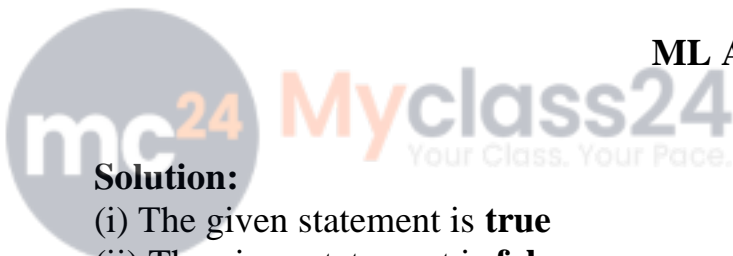
(ii)  $4/13 \div 11/12 = 11/12 \div 4/13$

(iii)  $-3/4 \div (5/9 \div -4/11) = (-3/4 \div 5/9) \div -4/11$

(iv)  $13/14 \div -5/7 \neq -5/7 \div 13/14$

(v)  $(-7 \div 4/5) \div -9/10 \neq -7 \div (4/5 \div -9/10)$

(vi)  $-7/24 \div 6/11$  is not a rational number.



**Solution:**

(i) The given statement is **true**

(ii) The given statement is **false**

Correct: Commutative property is not true for the division

(iii) The given statement is **false**

Correct: Associative in division is not **true**

(iv) The given statement is **true**

(v) The given statement is **true**

(vi) The given statement is **false**

Correct: It is a rational number

**3. The product of two rational numbers is  $-11/12$ . If one of them is  $2\frac{4}{9}$ , find the other.**

**Solution:**

Given

Product of two rational numbers =  $-11/12$

One of the number =  $2\frac{4}{9} = 22/9$

The other number is calculated as below

$$\begin{aligned} & -11/12 \div 22/9 \\ & = -11/12 \times 9/22 \end{aligned}$$

We get,

$$= -3/8$$

Therefore, the other number is  $-3/8$

**4. By what rational number should  $-7/12$  be multiplied to get the product as  $5/14$ ?**

**Solution:**

Given

Product =  $5/14$

The required number can be calculated as below

$$\begin{aligned} & 5/14 \div -7/12 \\ & = 5/14 \times 12/-7 \end{aligned}$$

We get,

$$= 30/-49$$

$$= \{30 \times (-1)\} / \{-49 \times (-1)\}$$

$$= -30/49$$

Hence, the required number is  $-30/49$

**5. By what rational number should  $-3$  be divided to get  $-9/13$ ?**

**Solution:**

The required number can be calculated as follows:

$$-3 \div -9/13$$

$$= -3 \times 13 / -9$$

We get,

$$= -13 / -3$$

$$= \{-13 \times (-1)\} / \{-3 \times (-1)\}$$

$$= 13 / 3$$

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

Therefore, the required number is  $4\frac{1}{3}$

**6. Divide the sum of  $-13/8$  and  $5/12$  by their difference.**

**Solution:**

Given

Sum of  $-13/8$  and  $5/12$  is calculated as,

$$= -13/8 + 5/12$$

On further calculation, we get

$$= (-39 + 10) / 24$$

We get,

$$= -29 / 24$$

Now,

Difference of  $-13/8$  and  $5/12$  is calculated as,

$$= -13/8 - 5/12$$

We get,

$$= (-39 - 10) / 24$$

$$= -49 / 24$$

Now,

$$-29/24 \div -49/24$$

$$= -29/24 \times 24 / -49$$

$$= -29 / -49$$

$$= \{-29 \times (-1)\} / \{-49 \times (-1)\}$$

We get,

$$= 29 / 49$$

**7. Divide the sum of  $8/3$  and  $4/7$  by the product of  $-3/7$  and  $14/9$ .**



**Solution:**

Sum of  $8/3$  and  $4/7$  is calculated as below

$$8/3 + 4/7 = (56 + 12) / 21$$

We get,

$$= 68 / 21$$

Product of  $-3/7$  and  $14/9$  is calculated as follows:

$$-3/7 \times 14/9 = -2/3$$

Hence,

$$68/21 \div -2/3 = 68/21 \times 3/-2$$

We get,

$$= 34 / -7$$

$$= \{34 \times (-1)\} / \{-7 \times (-1)\}$$

$$= -34 / 7$$

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

**8. If  $p = -3/2$ ,  $q = 4/5$  and  $r = -7/12$ , then verify that  $(p \div q) \div r \neq p \div (q \div r)$**

**Solution:**

Given

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

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

$$\text{LHS} = (p \div q) \div r$$

$$= (-3/2 \div 4/5) \div (-7/12)$$

$$= (-3/2 \times 5/4) \div (-7/12)$$

$$= -15/8 \div -7/12$$

$$= -15/8 \times 12/-7$$

We get,

$$= -45 / -14$$

$$= \{-45 \times (-1)\} / \{-14 \times (-1)\}$$

$$= 45 / 14$$

Now,

$$\text{RHS} = p \div (q \div r)$$

$$= -3/2 \div (4/5 \div (-7/12))$$

$$= -3/2 \div (4/5 \times 12/-7)$$

We get,

$$= -3/2 \div 48 / -35$$

$$= -3/2 \times -35 / 48$$

We get,

$$= 35 / 32$$



Therefore,  $LHS \neq RHS$

EXERCISE 1.5

1. Represent the following rational numbers on the number line.

(i)  $11/4$

(ii)  $4\frac{3}{5}$

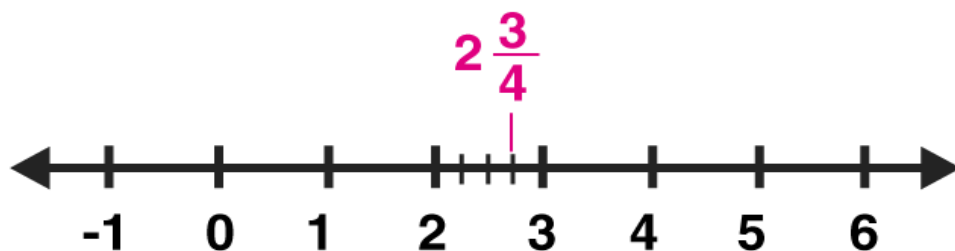
(iii)  $-9/7$

(iv)  $-2/-5$

Solution:

(i)  $11/4 = 2\frac{3}{4}$

The given rational number on the number line is shown as below:



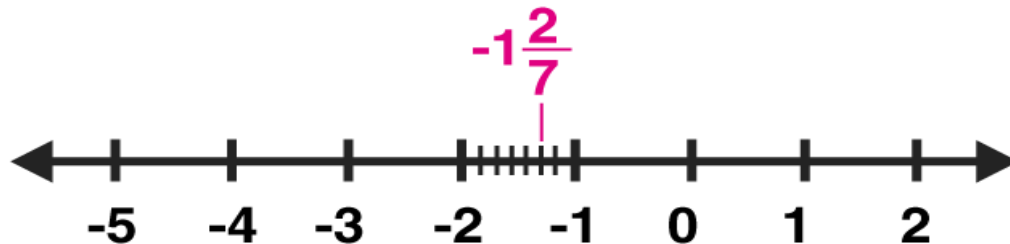
(ii)  $4\frac{3}{5}$

The given rational number on the number line is shown as below



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

The given rational number on the number line is shown as below

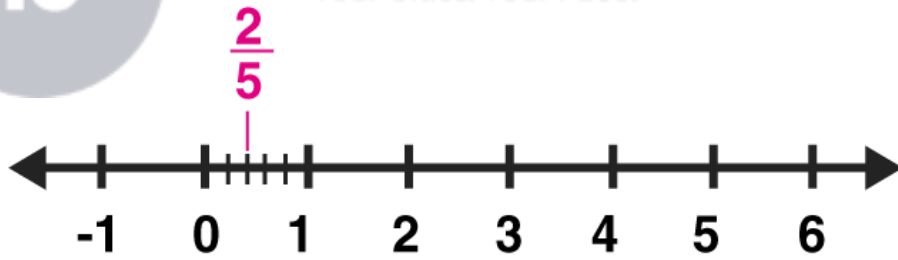


(iv)  $-2/-5 = -2 \times (-1) / -5 \times (-1)$

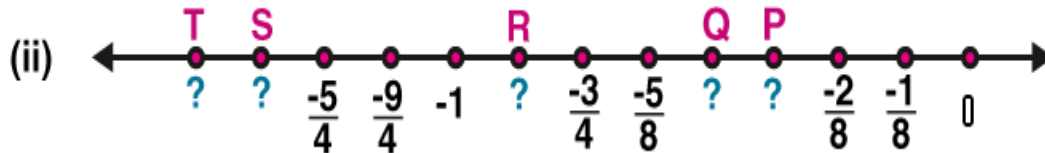
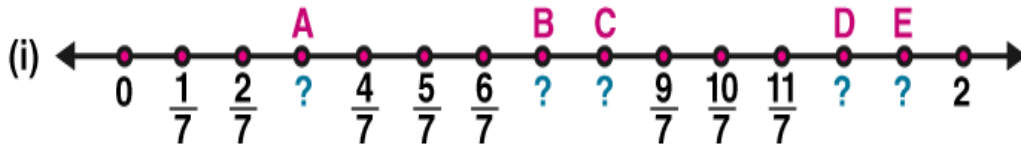
We get,

$= 2/5$

The given rational number on the number line is shown as below



2. Write the rational numbers for each point labeled with a letter:



**Solution:**

(i) The rational numbers for each point labeled with a letter are as follows:

$$A = 3/7$$

$$B = 7/7 = 1$$

$$C = 8/7 = 1\frac{1}{7}$$

$$D = 12/7 = 1\frac{5}{7}$$

$$E = 13/7 = 1\frac{6}{7}$$

(ii) The rational numbers for each point labeled with a letter are as follows:

$$P = -3/8$$

$$Q = -4/8 \text{ or } -1/2$$

$$R = -7/8$$

$$S = -11/8$$

$$T = -12/8 \text{ or } -3/2$$

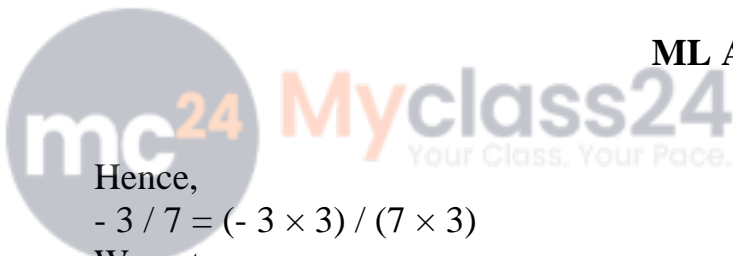
3. Find twenty rational numbers between  $-3/7$  and  $2/3$

**Solution:**

Twenty rational numbers between  $-3/7$  and  $2/3$  can be calculated as follows:

We know that,

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



Hence,

$$-3/7 = (-3 \times 3) / (7 \times 3)$$

We get,

$$= -9/21$$

$$2/3 = (2 \times 7) / (3 \times 7)$$

We get,

$$= 14/21$$

Now, twenty rational numbers between  $-9/21$  and  $14/21$  are,

$-8/21, -7/21, -6/21, -5/21, -4/21, -3/21, -2/21, -1/21, 0, 1/21, 2/21, 3/21, 4/21, 5/21, 6/21, 7/21, 8/21, 9/21, 10/21, 11/21, 12/21$  and  $13/21$

#### 4. Find six rational numbers between $-1/2$ and $5/4$

**Solution:**

Six rational numbers between  $-1/2$  and  $5/4$  can be calculated as below

LCM of 2, 4 = 4

$$-1/2 = (-1 \times 2) / (2 \times 2)$$

We get,

$$= -2/4$$

Now, six rational numbers between  $-1/2$  and  $5/4$  are as follows:

$-1/4, 0, 1/4, 2/4, 3/4$  and  $4/4$

#### 5. Find three rational numbers between $-2$ and $-1$

**Solution:**

Three rational numbers between  $-2$  and  $-1$  can be calculated as below:

First rational number =  $1/2 (-1 - 2)$

We get,

$$= -3/2$$

Second rational number =  $2$  and  $-3/2$

$$= 1/2 \{-2 - (3/2)\}$$

$$= 1/2 (-7/2)$$

We get,

$$= -7/4$$

Third rational number between  $-3/2$  and  $-1$

$$= 1/2 \{(-3/2) - 1\}$$

$$= 1/2 (-5/2)$$

$$= 1/2 \times -5/2$$

We get,

$$= -5/4$$

Therefore, three rational numbers are  $-7/4, -3/2, -5/4$

**6. Write ten rational numbers which are greater than 0.**

**Solution:**

Ten rational numbers which are greater than 0

There can be the finite number of a rational number greater than 1.

Here, we shall take only 10 rational numbers.

The numbers are as follows:

$(1/2)$ , 1,  $(3/2)$ , 2,  $(5/2)$ , 3,  $(7/2)$ , 4,  $(9/2)$ , 5 etc.

**7. Write five rational numbers which are smaller than  $-4$**

**Solution:**

Five rational numbers which are smaller than  $-4$

These can be finite number of rational numbers smaller than  $-4$

Here, we shall take only 5 rational numbers.

The numbers are as follows:

$(-9/2)$ ,  $-5$ ,  $(-11/2)$ ,  $-6$ ,  $(-13/2)$ , etc.

**8. Identify the rational number which is different from the other three. Explain your reasoning**

$(-5/11)$ ,  $(-1/2)$ ,  $(-4/9)$ ,  $(-7/3)$

**Solution:**

Given four rational number are,

$(-5/11)$ ,  $(-1/2)$ ,  $(-4/9)$ ,  $(-7/3)$

Among the given numbers,

$-7/3$  is different from the other three numbers.

Because in  $-7/3$  its denominator is less than its numerator

In other numbers, denominators are greater than their numerators respectively.

EXERCISE 1.6

1. In a bag, there are 20 kg of fruits. If  $7\frac{1}{6}$  kg of these fruits be oranges and  $8\frac{2}{3}$  kg of these are apples and rest are grapes. Find the mass of the grapes in the bag.

**Solution:**

Given

Total fruits in a bag = 20 kg

Oranges =  $7\frac{1}{6}$  kg i.e  $43 / 6$  kg

Apples =  $8\frac{2}{3}$  kg i.e  $26 / 3$  kg

Remaining fruits in a bag =  $20 - \{(43 / 6) + (26 / 3)\}$  kg  
 $= 20 - \{(43 + 52) / 6\}$

On further calculation, we get

$$= 20 - (95 / 6)$$

$$= (120 - 95) / 6$$

$$= 25 / 6$$

$$= 4\frac{1}{6} \text{ kg}$$

Therefore, the mass of the grapes in the bag is  $4\frac{1}{6}$  kg

2. The population of a city is 6, 63,432. If  $1 / 2$  of the population are adult males and  $1 / 3$  of the population are adult females, then find the number of children in the city.

**Solution:**

Given

Population of a city = 6, 63,432

Population of adult males =  $(1 / 2)$  of 6,63,432  
 $= 3,31,716$

Population of adult females =  $(1 / 3)$  of 6,63,432  
 $= 2,21,144$

Remaining population can be calculated as below

Remaining population =  $6,63,432 - (3,31,716 + 2,21,144)$   
 $= 6,63,432 - 5,52,860$

We get,

$$= 1,10,572$$

Therefore, number of children in a city are 1,10,572

3. In an election of housing society, there are 30 voters. Each of them gives the vote. Three persons X, Y and Z are standing for the post of Secretary. If Mr X got  $\frac{2}{5}$  of the total votes and Mr Z got  $\frac{1}{3}$  of the total votes, then find the number of votes which Mr Y got.

**Solution:**

Given

Number of votes = 30

Number of person for election = X, Y, Z

X got  $\frac{2}{5}$  of total votes =  $\frac{2}{5}$  of 30

$$= \frac{2}{5} \times 30$$

$$= 12$$

Z got  $\frac{1}{3}$  of total votes =  $\frac{1}{3}$  of 30

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

$$= 10$$

Remaining votes can be calculated as below

$$= 30 - (12 + 10)$$

$$= 30 - 22$$

We get,

$$= 8$$

Therefore, Mr Y got 8 votes

4. A person earns Rs 100 in a day. If he spent Rs  $14\frac{2}{7}$  on food and Rs  $30\frac{2}{3}$  on petrol. How much did he save on that day?

**Solution:**

Given

A person's earning in a day = Rs 100

Money spent on food = Rs  $14\frac{2}{7}$  = Rs  $100 / 7$

Money spent on petrol = Rs  $30\frac{2}{3}$  = Rs  $92 / 3$

The savings of a person is calculated as follows:

$$\text{Savings} = \text{Rs } 100 - \{(100 / 7 + 92 / 3)\}$$

$$= \text{Rs } 100 - \{(300 + 644) / 21\}$$

On further calculation, we get

$$= \text{Rs } 100 - (944 / 21)$$

$$= (2100 - 944) / 21$$

$$= \text{Rs } 1156 / 21$$

$$= \text{Rs } 55\frac{1}{21}$$

Hence, a person saved Rs  $55\frac{1}{21}$  on that day.

**5. In an examination, 400 students appeared. If  $\frac{2}{3}$  of the boys and all 130 girls passed in the examination, then find how many boys failed in an examination?**

**Solution:**

Given

Number of students appeared exams = 400

$(\frac{2}{3})$  of total boys and all 130 girls passed in the examination

Hence,

Number of total boys =  $400 - 130$

= 270

Number of boys passed =  $(\frac{2}{3})$  of 270

=  $(\frac{2}{3}) \times 270$

= 180

So, number of boys failed =  $270 - 180$

= 90

Hence, 90 boys failed in an examination.

**6. A car is moving at the speed of  $40\frac{2}{3}$  km / h. Find how much distance will it cover in  $9\frac{1}{10}$  hrs?**

**Solution:**

Given

Speed of a car =  $40\frac{2}{3}$  km / h =  $122\frac{2}{3}$  km / h

Distance covered in  $9\frac{1}{10}$  hour can be calculated as follows:

Distance =  $(122\frac{2}{3}) \times (9\frac{1}{10})$

=  $366\frac{3}{10}$

We get,

= 36.6 km

=  $36\frac{3}{5}$  km

Therefore, the distance covered by the car in  $9\frac{1}{10}$  hours is  $36\frac{3}{5}$  km

**7. Find the area of a square lawn whose one side is  $5\frac{7}{9}$  m long.**

**Solution:**

Given

One side of a square lawn =  $5\frac{5}{9}$  m =  $52/9$  m

The area of a square lawn can be calculated as follows:

$$\text{Area} = (\text{side})^2$$

$$= (52/9)^2$$

We get,

$$= 2704/81 \text{ sq. m}$$

$$= 33\frac{31}{81} \text{ sq. m}$$

Therefore, the area of a square lawn is  $33\frac{31}{81}$  sq. m

**8. Perimeter of a rectangle is  $15\frac{3}{7}$  m. If the length is  $4\frac{2}{7}$  m, find its breadth.**

**Solution:**

Given

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

$$= 108/7 \text{ m}$$

So,

$$\text{Length} + \text{Breadth} = (108/7) \div 2$$

$$= (108/7) \times (1/2)$$

We get,

$$= 54/7 \text{ m}$$

$$\text{Given length} = 4\frac{2}{7}$$

$$= 30/7 \text{ m}$$

Hence, breadth of a rectangle can be calculated as,

$$\text{Breadth} = (54/7) - (30/7)$$

$$= 24/7$$

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

Therefore, the breadth of a rectangle is  $3\frac{3}{7}$  m

**9. Rahul had a rope of  $325\frac{4}{5}$  m long. He cut off a  $150\frac{3}{5}$  m long piece, then he divided the rest of the rope into 3 parts of equal length. Find the length of each part.**

**Solution:**

Given

$$\text{Length of a rope} = 325\frac{4}{5} \text{ m}$$

$$\text{Length of one piece of rope after cut off} = 150\frac{3}{5} \text{ m}$$

Remaining length of a rope can be calculated as below

$$= 325\frac{4}{5} - 150\frac{3}{5}$$

We get,

$$= 175\frac{1}{5} \text{ m}$$

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

This length divided into three equal parts

So, length of each part can be calculated as follows:

$$\text{Length of each part} = (876 / 5) \div 3$$

$$= (876 / 5) \times (1 / 3)$$

We get,

$$= 292 / 5 \text{ m}$$

$$= 58\frac{2}{5} \text{ m}$$

Therefore, the length of each part of a rope is  $58\frac{2}{5} \text{ m}$

**10. If  $3\frac{1}{2}$  litre of petrol costs Rs  $270\frac{3}{8}$ , then find the cost of 4 litre of petrol.**

**Solution:**

Given

$$\text{Cost of } 3\frac{1}{2} \text{ litre} = 7 / 2 \text{ litre of petrol} = \text{Rs } 270\frac{3}{8}$$

$$= \text{Rs } 2163 / 8$$

Hence, the cost of one litre can be calculated as below:

$$\text{Cost of one litre} = \text{Rs } (2163 \times 2) / (8 \times 7)$$

The cost of 4 litre of petrol can be calculated as below

$$\text{Cost of 4 litre} = \text{Rs } (2163 \times 2 \times 4) / (8 \times 7)$$

We get,

$$= \text{Rs } 309$$

Therefore, the cost of 4 litre of petrol is Rs 309

**11. Ramesh earns Rs 40,000 per month. He spends  $3 / 8$  of the income on food,  $1 / 5$  of the remaining on LIC premium and then  $1 / 2$  of the remaining on other expenses. Find how much money is left with him?**



**Solution:**

Ramesh earnings per month = Rs 40,000

Expenditure on food =  $(3 / 8)$  of Rs 40, 000  
= Rs 15,000

Remaining amount =  $40,000 - 15,000$   
= Rs 25,000

Expenditure on LIC premium =  $(1 / 5)$  of Rs 25,000  
= Rs 5000

Remaining amount = Rs 25000 – Rs 5000  
= Rs 20,000

Expenditure on other expenses =  $(1 / 2)$  of Rs 20,000  
= Rs 10,000

Remaining amount left = Rs 20,000 – Rs 10,000  
= Rs 10,000

Therefore, the remaining amount left with Ramesh is Rs 10,000

**12. A, B, C, D and E went to a restaurant for dinner. A paid  $1 / 2$  of the bill, B paid  $1 / 5$  of the bill and rest of the bill was shared equally by C, D and E. What fractions of the bill was paid by each?**

**Solution:**

Let us consider the total bill of the restaurant = 1

Bill paid by A =  $1 / 2$

Bill paid by B =  $1 / 5$

Remaining bill can be calculated as below:

Remaining bill =  $1 - \{(1 / 2) + (1 / 5)\}$

=  $1 - \{(5 + 2) / 10\}$

=  $1 - (7 / 10)$

We get,

=  $3 / 10$

Shares of the three persons =  $(3 / 10) \div 3$

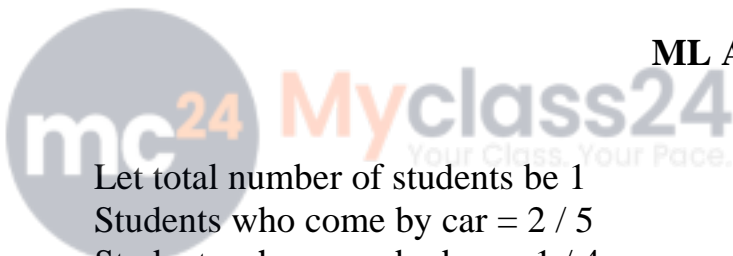
=  $(3 / 10) \times (1 / 3)$

=  $1 / 10$

Therefore, each paid  $(1 / 10)$  of the bill.

**13.  $2 / 5$  of total number of students of a school come by car while  $1 / 4$  of students come by bus to school. All the other students walk to school of which  $1 / 3$  walk on their own and the rest are escorted by their parents. If 224 students come to school walking on their own, how many students study in the school?**

**Solution:**



Let total number of students be 1  
Students who come by car =  $\frac{2}{5}$   
Students who come by bus =  $\frac{1}{4}$   
Students who come by walking =  $\frac{1}{3}$  of remaining  
Rest students =  $1 - (\frac{2}{5} + \frac{1}{4})$   
 $= 1 - \frac{(8 + 5)}{20}$   
 $= 1 - \frac{13}{20}$

We get,  
 $= \frac{7}{20}$

Number of students who come by walking can be calculated as below

Number of students who come by walking =  $\frac{1}{3}$  of  $\frac{7}{20}$   
 $= \frac{7}{60}$

Now,  $\frac{7}{60}$  of total students = 224

Total students =  $(224 \times 60) / 7$   
 $= 32 \times 60$   
 $= 1920$

Hence, 1920 students study in the school

**14. A mother and her two sons got a room constructed for Rs 60,000. The elder son contributes  $\frac{3}{8}$  of his mother's contribution while the younger son contributes  $\frac{1}{2}$  of his mother's share. How much do the three contribute individually?**

**Solution:**

The cost of a room = Rs 60,000

Elder son contribution =  $\frac{3}{8}$  of his mother's contribution

Younger son contribution =  $\frac{1}{2}$  of his mother's share

Let the mother contribution be 1

Elder son's contribution =  $\frac{3}{8}$

Younger son's contribution =  $\frac{1}{2}$

Now,

Ratios in their share = 1 :  $(\frac{3}{8})$  :  $(\frac{1}{2})$

$= 8 : 3 : 4$

Sum of ratios =  $8 + 3 + 4$

$= 15$

Therefore,

Mother's share =  $(60000 \times 8) / 15$

$= \text{Rs } 32000$

Elder son's share =  $(60000 \times 3) / 15$

$= \text{Rs } 12000$

Younger son's share =  $(60000 \times 4) / 15$



**15. In a class of 56 students, the number of boys is  $\frac{2}{5}$  th of the number of girls. Find the number of boys and girls.**

**Solution:**

Total number of students in a class = 56

Let the number of girls be 1

Then number of boys will be =  $\frac{2}{5}$  of 1  
=  $\frac{2}{5}$

Ratios in girls and boys = 1: ( $\frac{2}{5}$ )  
= 5: 2

Number of girls =  $\{56 / (5 + 2)\} \times 5$   
=  $(56 / 7) \times 5$   
= 40

And number of boys =  $(56 / 7) \times 2$   
= 16

Therefore, number of boys = 16 and number of girls = 40

**16. A man donated  $\frac{1}{10}$  of his money to a school,  $\frac{1}{6}$  th of the remaining to a church and the remaining money he distributed equally among his three children. If each child gets Rs 50000, how much money did the man originally have?**

**Solution:**

Let the money of a man be 1

Money donated to a school =  $\frac{1}{10}$

Remaining money =  $1 - (\frac{1}{10})$   
=  $\frac{9}{10}$

Money donated to a church =  $\frac{1}{6}$  of  $\frac{9}{10}$   
=  $\frac{3}{20}$

Hence, remaining money =  $(\frac{9}{10}) - (\frac{3}{20})$   
=  $(\frac{18 - 3}{20})$   
=  $\frac{15}{20}$

A man divides equally to his three children

Hence,

Share of each child =  $(\frac{15}{20}) \div 3$   
=  $(\frac{15}{20}) \times (\frac{1}{3})$   
=  $\frac{1}{4}$

Here, each child gets Rs 50000

Therefore, his total money = Rs  $50000 \times (\frac{4}{1})$   
= Rs 200000

**17. If  $1/4$  of a number is added to  $1/3$  of that number, the result is 15 greater than half of that number. Find the number.**

**Solution:**

Let us consider the number as  $x$

Then as per the condition,

$$(1/4)x + (1/3)x - (1/2)x = 15$$

$$(3x + 4x - 6x) / 12 = 15$$

$$(1/12)x \text{ of a number} = 15$$

$$x = 15 \times 12 / 1$$

$$x = 180$$

Therefore, the required number is 180

**18. A student was asked to multiply a given number by  $4/5$ . By mistake, he divided the given number by  $4/5$ . His answer was 36 more than the correct answer. What was the given number?**

**Solution:**

Let the given number be  $x$

According to the condition,

$$x \times 4/5 = (4/5)x$$

But by mistake a student divides the given number

Then,

$$x \div 4/5 = x \times 5/4$$

$$= (5/4)x$$

Hence,

$$(5/4)x - (4/5)x = 36$$

$$(25x - 16x) / 20 = 36$$

$$9x / 20 = 36$$

$$9x = 36 \times 20$$

$$x = (36 \times 20) / 9$$

We get,

$$x = 80$$

Therefore, the given number is 80