

EXERCISE 14(A)

1. For each expression, given below, write a fraction:

- (i) 2 out of 7 =
- (ii) 5 out of 17 =
- (iii) three-fifths =

Solution:

- (i) The fraction for 2 out of 7 is written as $2/7$
- (ii) The fraction for 5 out of 17 is written as $5/17$
- (iii) The fraction for three-fifths is written as $3/5$

2. Fill in the blanks:

- (i) $5/8$ is fraction
- (ii) $8/5$ is fraction
- (iii) $-15/-15$ isfraction
- (iv) The value of $5/5 =$
- (v) The value of $5/-5 =$

Solution:

- (i) $5/8$ is **proper** fraction
- (ii) $8/5$ is **improper** fraction
- (iii) $-15/-15$ is **improper** fraction
- (iv) The value of $5/5 = 1$
- (v) The value of $5/-5 = -1$

3. From the following fractions, separate:

- (i) Proper fractions
- (ii) Improper fractions:
 $2/9, 4/3, 7/15, 11/20, 20/11, 18/23$ and $27/35$

Solution:

- (i) A fraction whose numerator is less than denominator is known as proper fractions
The proper fractions are $2/9, 7/15, 11/20, 18/23$ and $27/35$
- (ii) A fraction whose numerator is greater than denominator is known as improper fractions
The improper fractions are $4/3$ and $20/11$

4. Change the following mixed fractions to improper fractions:

- (i) $2\frac{1}{5}$
- (ii) $3\frac{1}{4}$

(iii) $7\frac{1}{8}$

(iv) $2\frac{1}{11}$

Solution:

(i) $2\frac{1}{5}$

The conversion of mixed fraction to an improper fraction is shown below

$$\begin{aligned} 2\frac{1}{5} &= (2 \times 5 + 1) / 5 \\ &= (10 + 1) / 5 \\ &= 11 / 5 \end{aligned}$$

(ii) $3\frac{1}{4}$

The conversion of mixed fraction to an improper fraction is shown below

$$\begin{aligned} 3\frac{1}{4} &= (3 \times 4 + 1) / 4 \\ &= (12 + 1) / 4 \\ &= 13 / 4 \end{aligned}$$

(iii) $7\frac{1}{8}$

The conversion of mixed fraction to an improper fraction is shown below

$$\begin{aligned} 7\frac{1}{8} &= (7 \times 8 + 1) / 8 \\ &= (56 + 1) / 8 \\ &= 57 / 8 \end{aligned}$$

(iv) $2\frac{1}{11}$

The conversion of mixed fraction to an improper fraction is shown below

$$\begin{aligned} 2\frac{1}{11} &= (2 \times 11 + 1) / 11 \\ &= (22 + 1) / 11 \\ &= 23 / 11 \end{aligned}$$

5. Change the following improper fractions to mixed fractions:

(i) $100 / 17$

(ii) $81 / 11$

(iii) $-209 / 7$

(iv) $-113 / 15$

Solution:

(i) $100 / 17$

The conversion of an improper fraction into mixed fractions is shown below

$$100 / 17 = 5 \frac{15}{17}$$

(ii) $81 / 11$

The conversion of an improper fraction into mixed fraction is shown below

$$81 / 11 = 7 \frac{4}{11}$$

(iii) $-209 / 7$

The conversion of an improper fraction into mixed fraction is shown below

$$-209 / 7 = -29 \frac{6}{7}$$

(iv) $-113 / 15$

The conversion of an improper fraction into mixed fraction is shown below

$$-113 / 15 = -7 \frac{8}{15}$$

6. Change the following groups of fractions to like fractions:

(i) $1 / 3, 2 / 5, 3 / 4, 1 / 6$

(ii) $5 / 6, 7 / 8, 11 / 12, 3 / 10$

(iii) $2 / 7, 7 / 8, 5 / 14, 9 / 16$

Solution:

(i) $1 / 3, 2 / 5, 3 / 4, 1 / 6$

The conversion of fractions to like fractions is shown below

LCM of the denominator 3, 5, 4, 6 = 60

2	3	5	4	6
3	3	5	2	3
	1	5	2	1

$$= 2 \times 3 \times 1 \times 5 \times 2 \times 1$$

$$= 60$$

$$1 / 3 = (1 \times 20) / (3 \times 20)$$

$$= 20 / 60$$

$$2 / 5 = (2 \times 12) / (5 \times 12)$$

$$= 24 / 60$$

$$3 / 4 = (3 \times 15) / (4 \times 15)$$

$$= 45 / 60$$

$$1 / 6 = (1 \times 10) / (6 \times 10)$$

$$= 10 / 60$$

Hence $1 / 3, 2 / 5, 3 / 4, 1 / 6 = 20 / 60, 24 / 60, 45 / 60, 10 / 60$

(ii) $5/6, 7/8, 11/12, 3/10$

The conversion of fractions to like fractions is shown below

LCM of the denominators 6, 8, 12, 10 = 120

2	6	8	12	10
2	3	4	6	5
3	3	2	3	5
	1	2	1	5

$$= 2 \times 2 \times 3 \times 1 \times 2 \times 1 \times 5$$

$$= 120$$

$$5/6 = (5 \times 20) / (6 \times 20)$$

$$= 100 / 120$$

$$7/8 = (7 \times 15) / (8 \times 15)$$

$$= 105 / 120$$

$$11/12 = (11 \times 10) / (12 \times 10)$$

$$= 110 / 120$$

$$3/10 = (3 \times 12) / (10 \times 12)$$

$$= 36 / 120$$

Hence $5/6, 7/8, 11/12, 3/10 = 100/120, 105/120, 110/120, 36/120$

(iii) $2/7, 7/8, 5/14, 9/16$

LCM of the denominators 7, 8, 14, 16 = 112

2	7	8	14	16
7	7	4	7	8
4	1	4	1	8
	1	1	1	2

$$= 2 \times 7 \times 4 \times 1 \times 1 \times 1 \times 2$$

$$= 112$$

$$2/7 = (2 \times 16) / (7 \times 16)$$

$$= 32 / 112$$

$$7/8 = (7 \times 14) / (8 \times 14)$$

$$= 98 / 112$$

$$5/14 = (5 \times 8) / (14 \times 8)$$

$$= 40 / 112$$

$$9/16 = (9 \times 7) / (16 \times 7)$$

$$= 63 / 112$$

Hence $2/7, 7/8, 5/14, 9/16 = 32/112, 98/112, 40/112, 63/112$

EXERCISE 14(B)**1. Reduce the given fractions to their lowest terms:**

(i) $8 / 10$

(ii) $50 / 75$

(iii) $18 / 81$

(iv) $40 / 120$

(v) $105 / 70$

Solution:

(i) $8 / 10$

The fraction $8 / 10$ can be simplified as below

$$8 / 10 = (8 \div 2) / (10 \div 2)$$

$$= 4 / 5$$

Hence $4 / 5$ is the simplified form of $8 / 10$

(ii) $50 / 75$

The fraction $50 / 75$ can be simplified as below

$$50 / 75 = (50 \div 25) / (75 \div 25)$$

$$= 2 / 3$$

Hence $2 / 3$ is the simplified form of $50 / 75$

(iii) $18 / 81$

The fraction $18 / 81$ can be simplified as below

$$18 / 81 = (18 \div 9) / (81 \div 9)$$

$$= 2 / 9$$

Hence $2 / 9$ is the simplified form of $18 / 81$

(iv) $40 / 120$

The fraction $40 / 120$ can be simplified as below

$$40 / 120 = (40 \div 40) / (120 \div 40)$$

$$= 1 / 3$$

Hence $1 / 3$ is the simplified form of $40 / 120$

(v) $105 / 70$

The fraction $105 / 70$ can be simplified as below

$$105 / 70 = (105 \div 35) / (70 \div 35)$$

$$= 3 / 2$$

Hence $3 / 2$ is the simplified form of $105 / 70$ **2. State, whether true or false?**

(i) $2 / 5 = 10 / 15$

(ii) $35 / 42 = 5 / 6$

(iii) $5 / 4 = 4 / 5$

$$(iv) 7/9 = 1\frac{1}{9}$$

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

Solution:

$$(i) 2/5 = 10/15$$

The given expression can be solved as below

$$2/5 = (10 \div 5) / (15 \div 5)$$

$$2/5 \neq 2/3$$

Hence false

$$(ii) 35/42 = 5/6$$

The given expression can be solved as below

$$(35 \div 7) / (42 \div 7) = 5/6$$

$$5/6 = 5/6$$

Hence true

$$(iii) 5/4 = 4/5$$

The given expression can be solved as below

$$5/4 \neq 4/5$$

Hence false

$$(iv) 7/9 = 1\frac{1}{9}$$

The given expression can be solved as below

$$7/9 = (7 \times 1 + 1) / 9$$

$$7/9 \neq 8/9$$

Hence false

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

The given expression can be solved as below

$$9/7 = (7 \times 1 + 2) / 7$$

$$9/7 \neq 8/7$$

Hence false

3. Which fraction is greater?

(i) $3/5$ or $2/3$

(ii) $5/9$ or $3/4$

(iii) $11/14$ or $26/35$

Solution:

(i) $3/5$ or $2/3$

The given fractions can be simplified as follows

LCM of 5, 3 is 15

$$\begin{aligned} \text{Hence } 3/5 &= (3 \times 3) / (5 \times 3) \\ &= 9/15 \text{ and} \end{aligned}$$

$$\begin{aligned} 2/3 &= (2 \times 5) / (3 \times 5) \\ &= 10/15 \end{aligned}$$

We know that

$$10/15 > 9/15 \quad [\text{Numerator is greater}]$$

Thus, $2/3 > 3/5$

Hence $2/3$ is greater fraction

(ii) $5/9$ or $3/4$

The given expression can be simplified as follows

First convert the given expression into like fractions

$$\begin{aligned} \text{So, } 5/9 &= (5 \times 4) / (9 \times 4) \\ &= 20/36 \text{ and} \end{aligned}$$

$$\begin{aligned} 3/4 &= (3 \times 9) / (4 \times 9) \\ &= 27/36 \end{aligned}$$

We know that

$$27/36 > 20/36 \quad [\text{Numerator is greater}]$$

Thus $3/4 > 5/9$

Hence $3/4$ is greater fraction

(iii) $11/14$ or $26/35$

The given expression can be simplified as follows

First convert the given expression into like fractions

$$\begin{aligned} \text{So, } 11/14 &= (11 \times 5) / (14 \times 5) \\ &= 55/70 \text{ and} \end{aligned}$$

$$\begin{aligned} 26/35 &= (26 \times 2) / (35 \times 2) \\ &= 52/70 \end{aligned}$$

We know that

$$55/70 > 52/70 \quad [\text{Numerator is greater}]$$

Thus, $11/14 > 26/35$

Hence $11/14$ is greater fraction

4. Which fraction is smaller?

(i) $3/8$ or $4/5$

(ii) $8/15$ or $4/7$

(iii) $7/26$ or $10/39$

Solution:

(i) $3/8$ or $4/5$

The given expression can be simplified as follows

First convert the given expression into like fractions

$$\text{So, } 3/8 = (3 \times 5) / (8 \times 5)$$

$$= 15/40 \text{ and}$$

$$4/5 = (4 \times 8) / (5 \times 8)$$

$$= 32/40$$

We know that

$$15/40 < 32/40 \quad [\text{Numerator is smaller}]$$

$$\text{Thus, } 3/8 < 4/5$$

Hence $3/8$ is the smaller fraction

(ii) $8/15$ or $4/7$

The given expression can be simplified as follows

First convert the given expression into like fractions

$$\text{So, } 8/15 = (8 \times 7) / (15 \times 7)$$

$$= 56/105 \text{ and}$$

$$4/7 = (4 \times 15) / (7 \times 15)$$

$$= 60/105$$

We know that

$$56/105 < 60/105 \quad [\text{Numerator is smaller}]$$

$$\text{Thus, } 8/15 < 4/7$$

Hence $8/15$ is the smaller fraction

(iii) $7/26$ or $10/39$

The given expression can be simplified as follows

First convert the given expression into like fractions

$$\text{So, } 7/26 = (7 \times 3) / (26 \times 3)$$

$$= 21/78 \text{ and}$$

$$10/39 = (10 \times 2) / (39 \times 2)$$

$$= 20/78$$

We know that

$$20/78 < 21/78 \quad [\text{Numerator is smaller}]$$

$$\text{Thus, } 10/39 < 7/26$$

Hence $10/39$ is the smaller fraction

5. Arrange the given fractions in descending order of magnitude:

(i) $5/16, 13/24, 7/8$

(ii) $4/5, 7/15, 11/20, 3/4$

(iii) $5/7, 3/8, 9/11$

Solution:

(i) $5/16, 13/24, 7/8$

The given expression can be simplified as follows

2	16	24	8
2	8	12	4
2	4	6	2
2	2	3	1
3	1	3	1
	1	1	1

$$\text{LCM of } 16, 24, 8 = 2 \times 2 \times 2 \times 2 \times 3$$

$$= 48$$

Converting given expression into like fractions, we get

$$5 / 16 = (5 \times 3) / (16 \times 3)$$

$$= 15 / 48 \text{ and}$$

$$13 / 24 = (13 \times 2) / (24 \times 2)$$

$$= 26 / 48 \text{ and}$$

$$7 / 8 = (7 \times 6) / (8 \times 6)$$

$$= 42 / 48$$

Hence, fractions in descending order are $7 / 8, 13 / 24, 5 / 16$

(ii) $4 / 5, 7 / 15, 11 / 20, 3 / 4$

The given expression can be simplified as follows

4	5	15	20	4
5	5	15	5	1
3	1	3	1	1
	1	1	1	1

$$\text{LCM of } 5, 15, 20, 4 = 4 \times 5 \times 3$$

$$= 60$$

Converting the given expression into like fractions, we get

$$4 / 5 = (4 \times 12) / (5 \times 12)$$

$$= 48 / 60 \text{ and}$$

$$7 / 15 = (7 \times 4) / (15 \times 4)$$

$$= 28 / 60 \text{ and}$$

$$11 / 20 = (11 \times 3) / (20 \times 3)$$

$$= 33 / 60 \text{ and}$$

$$3 / 4 = (3 \times 15) / (4 \times 15)$$

$$= 45 / 60$$

Hence, fractions in descending order are $4 / 5, 3 / 4, 11 / 20, 7 / 15$

(iii) $5 / 7, 3 / 8, 9 / 11$

The given expression can be simplified as follows

3	5	3	9
5	5	1	3
3	1	1	3
	1	1	1

$$\text{LCM of } 5, 3, 9 = 3 \times 3 \times 5$$

$$= 45$$

Converting the given expression into like fractions, we get

$$5/7 = (5 \times 9) / (7 \times 9)$$

$$= 45 / 63 \text{ and}$$

$$3/8 = (3 \times 15) / (8 \times 15)$$

$$= 45 / 120 \text{ and}$$

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

$$= 45 / 55$$

The fraction with the smallest denominator is the biggest fraction if the numerator is same

Hence, fractions in descending order are

$$45 / 55, 45 / 63, 45 / 120 \text{ i.e.}$$

$$9 / 11, 5 / 7, 3 / 8$$

6. Arrange the given fractions in ascending order of magnitude:

(i) $9 / 16, 7 / 12, 1 / 4$

(ii) $5 / 6, 2 / 7, 8 / 9, 1 / 3$

(iii) $2 / 3, 5 / 9, 5 / 6, 3 / 8$

Solution:

(i) $9 / 16, 7 / 12, 1 / 4$

The given fractions can be simplified as follows

4	16	12	4
4	4	3	1
3	1	3	1
	1	1	1

$$\text{LCM of } 16, 12, 4 = 48$$

Converting the given expression into like fractions, we get

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

$$= 27 / 48 \text{ and}$$

$$7 / 12 = (7 \times 4) / (12 \times 4)$$

$$= 28 / 48 \text{ and}$$

$$1 / 4 = (1 \times 12) / (4 \times 12)$$

$$= 12 / 48$$

Hence, fractions in ascending order are

$12 / 48, 27 / 48, 28 / 48$ i.e

$1 / 4, 9 / 16, 7 / 12$

(ii) $5 / 6, 2 / 7, 8 / 9, 1 / 3$

The given fractions can be simplified as follows

3	6	7	9	3
3	2	7	3	1
2	2	7	1	1
7	1	7	1	1
	1	1	1	1

LCM of 6, 7, 9, 3 = $3 \times 3 \times 2 \times 7$
= 126

Converting the given expression into like fractions, we get

$$5 / 6 = (5 \times 21) / (6 \times 21)$$

$$= 105 / 126 \text{ and}$$

$$2 / 7 = (2 \times 18) / (7 \times 18)$$

$$= 36 / 126 \text{ and}$$

$$8 / 9 = (8 \times 14) / (9 \times 14)$$

$$= 112 / 126 \text{ and}$$

$$1 / 3 = (1 \times 42) / (3 \times 42)$$

$$= 42 / 126$$

Hence, fractions in ascending order are

$36 / 126, 42 / 126, 105 / 126, 112 / 126$ i.e

$2 / 7, 1 / 3, 5 / 6, 8 / 9$

(iii) $2 / 3, 5 / 9, 5 / 6, 3 / 8$

The given fractions can be simplified as follows

2	3	9	6	8
3	3	9	3	4
3	1	3	1	4
4	1	1	1	4
	1	1	1	1

LCM of 3, 9, 6, 8 = 72

Converting the given expressions into like fractions, we get

$$2 / 3 = (2 \times 24) / (3 \times 24)$$

$$= 48 / 72 \text{ and}$$

$$5 / 9 = (5 \times 8) / (9 \times 8)$$

$$= 40 / 72 \text{ and}$$

$$5 / 6 = (5 \times 12) / (6 \times 12)$$

$$= 60 / 72 \text{ and}$$

$$3 / 8 = (3 \times 9) / (8 \times 9)$$

$$= 27 / 72$$

Hence, fractions in ascending order are

$$27 / 72, 40 / 72, 48 / 72, 60 / 72 \text{ i.e.}$$

$$3 / 8, 5 / 9, 2 / 3, 5 / 6$$

7. I bought one dozen bananas and ate five of them. What fraction of the total number of bananas was left?

Solution:

Given

Number of bananas bought = 1 dozen

We know there are 12 bananas in a dozen

Number of bananas eaten = 5

Number of bananas left = $12 - 5$

$$= 7$$

Therefore, the required fraction is $7 / 12$

8. Insert the symbol ‘=’ or ‘>’ or ‘<’ between each of the pairs of fractions, given below:

(i) $6 / 11$ $5 / 9$

(ii) $3 / 7$ $9 / 13$

(iii) $56 / 64$ $7 / 8$

(iv) $5 / 12$ $8 / 33$

Solution:

(i) $6 / 11$ $5 / 9$

LCM of 11, 9 = 99

Converting the given expression into like fraction

We get

$$6 / 11 = (6 \times 9) / (11 \times 9)$$

$$= 54 / 99 \text{ and}$$

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

$$= 55 / 99$$

Therefore,

$$54 / 99 < 55 / 99 \text{ i.e.}$$

$$6 / 11 < 5 / 9$$

(ii) $3 / 7$ $9 / 13$

LCM of 7, 13 = 91

Converting the given expression into like fraction

We get

$$3 / 7 = (3 \times 13) / (7 \times 13)$$

$$= 39 / 91 \text{ and}$$

$$9 / 13 = (9 \times 7) / (13 \times 7)$$

$$= 63 / 91$$

Therefore,

$$39 / 91 < 63 / 91 \text{ i.e.}$$

$$3 / 7 < 9 / 13$$

(iii) $56 / 64 \dots 7 / 8$

$$\text{LCM of } 64, 8 = 64$$

Converting the given expression into like fraction

We get

$$56 / 64 = (56 \times 1) / (64 \times 1)$$

$$= 56 / 64 \text{ and}$$

$$7 / 8 = (7 \times 8) / (8 \times 8)$$

$$= 56 / 64$$

Therefore,

$$56 / 64 = 56 / 64 \text{ i.e.}$$

$$56 / 64 = 7 / 8$$

(iv) $5 / 12 \dots 8 / 33$

$$\text{LCM of } 12, 33 = 132$$

Converting the given expression into like fractions

We get

$$5 / 12 = (5 \times 11) / (12 \times 11)$$

$$= 55 / 132 \text{ and}$$

$$8 / 33 = (8 \times 4) / (33 \times 4)$$

$$= 32 / 132$$

$$55 / 132 > 32 / 132 \text{ i.e.}$$

$$5 / 12 > 8 / 33$$

9. Out of 50 identical articles, 36 are broken. Find the fraction of:

(i) The total number of articles and the articles broken.

(ii) The remaining articles and total number of articles.

Solution:

(i) Given

$$\text{Total number of articles} = 50$$

$$\text{Number of articles broken} = 36$$

$$\text{Remaining articles} = 50 - 36$$

$$= 14$$

$$\text{The fraction of total number of articles and articles broken} = 50 / 36$$

$$= 25 / 18$$

(ii) Given

Total number of articles = 50

Number of articles broken = 36

Remaining articles = $50 - 36$

= 14

The fraction of remaining articles and total number of articles = $14 / 50$

= $7 / 25$



EXERCISE 14(C)

1. Add the following fractions:

(i) $1\frac{3}{4}$ and $3/8$

(ii) $2/5$, $2\frac{3}{15}$ and $7/10$

(iii) $1\frac{7}{8}$, $1\frac{1}{2}$ and $1\frac{3}{4}$

(iv) $3\frac{3}{4}$, $2\frac{1}{6}$, and $1\frac{5}{8}$

(v) $2\frac{8}{9}$, $11/18$ and $3\frac{5}{6}$

Solution:

(i) $1\frac{3}{4}$ and $3/8$

The given fractions can be added as follows

$$\begin{aligned} 7/4 + 3/8 &= (7 \times 2) / (4 \times 2) + 3/8 \\ &= 14/8 + 3/8 \\ &= 17/8 \\ &= 2\frac{1}{8} \end{aligned}$$

Hence, $2\frac{1}{8}$ is the addition of given fractions

(ii) $2/5$, $2\frac{3}{15}$ and $7/10$

The given fractions can be added as follows

$$\begin{aligned} 2/5 + 33/15 + 7/10 &= (2 \times 6) / (5 \times 6) + (33 \times 2) / (15 \times 2) + (7 \times 3) / (10 \times 3) \\ &= 12/30 + 66/30 + 21/30 \\ &= 99/30 \\ &= 33/10 \\ &= 3\frac{3}{10} \end{aligned}$$

Hence, $3\frac{3}{10}$ is the addition of given fractions

(iii) $1\frac{7}{8}$, $1\frac{1}{2}$ and $1\frac{3}{4}$

The given fractions can be added as follows

$$\begin{aligned} 15/8 + 3/2 + 7/4 &= (15 \times 1) / (8 \times 1) + (3 \times 4) / (2 \times 4) + (7 \times 2) / (4 \times 2) \\ &= 15/8 + 12/8 + 14/8 \\ &= 41/8 \end{aligned}$$

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

Hence, $5\frac{1}{8}$ is the addition of the given fractions

$$(iv) 3\frac{3}{4}, 2\frac{1}{6} \text{ and } 1\frac{5}{8}$$

The given fractions can be added as follows

$$15/4 + 13/6 + 13/8 = (15 \times 6)/(4 \times 6) + (13 \times 4)/(6 \times 4) + (13 \times 3)/(8 \times 3)$$

$$= 90/24 + 52/24 + 39/24$$

$$= 181/24$$

$$= 7\frac{13}{24}$$

Hence, $7\frac{13}{24}$ is the addition of given fractions

$$(v) 2\frac{8}{9}, 11/18 \text{ and } 3\frac{5}{6}$$

The given fractions can be added as follows

$$26/9 + 11/18 + 23/6 = (26 \times 2)/(9 \times 2) + 11/18 + (23 \times 3)/(6 \times 3)$$

$$= 52/18 + 11/18 + 69/18$$

$$= 132/18$$

$$= 22/3$$

$$= 7\frac{1}{3}$$

Hence, $7\frac{1}{3}$ is the addition of given fractions

2. Simplify:

$$(i) 1\frac{11}{12} - 13/16$$

$$(ii) 2\frac{3}{4} - 1\frac{5}{6}$$

$$(iii) 2\frac{5}{7} + 3/14 - 13/21$$

$$(iv) 3\frac{5}{6} - 1/6 - 1\frac{1}{12}$$

$$(v) 6 + 3/10 - 1\frac{8}{15}$$

Solution:

$$(i) 1\frac{11}{12} - 13/16$$

The given expression can be simplified as below

$$\begin{aligned} 23 / 12 - 13 / 16 &= (23 \times 4) / (12 \times 4) - (13 \times 3) / (16 \times 3) \\ &= (92 - 39) / 48 \\ &= 53 / 48 \\ &= 1 \frac{5}{48} \end{aligned}$$

Hence, simplified form of the given expression is $1 \frac{5}{48}$

(ii) $2 \frac{3}{4} - 1 \frac{5}{6}$

The given expression can be simplified as below

$$\begin{aligned} 11 / 4 - 11 / 6 &= (11 \times 6) / (4 \times 6) - (11 \times 4) / (6 \times 4) \\ &= (66 - 44) / 24 \\ &= 22 / 24 \\ &= 11 / 12 \end{aligned}$$

Hence, simplified form of the given expression is $11 / 12$

(iii) $2 \frac{5}{7} + 3 / 14 - 13 / 21$

The given expression can be simplified as below

$$\begin{aligned} 19 / 7 + 3 / 14 - 13 / 21 &= (19 \times 6) / (7 \times 6) + (3 \times 3) / (14 \times 3) - (13 \times 2) / (21 \times 2) \\ &= 114 / 42 + 9 / 42 - 26 / 42 \\ &= (114 + 9 - 26) / 42 \\ &= 97 / 42 \\ &= 2 \frac{13}{42} \end{aligned}$$

Hence, simplified form of the given expression is $2 \frac{13}{42}$

(iv) $3 \frac{5}{6} - 1 / 6 - 1 \frac{1}{12}$

The given expression can be simplified as below

$$\begin{aligned} 23 / 6 - 1 / 6 - 13 / 12 &= (23 \times 2) / (6 \times 2) - (1 \times 2) / (6 \times 2) - 13 / 12 \\ &= 46 / 12 - 2 / 12 - 13 / 12 \\ &= (46 - 2 - 13) / 12 \\ &= 31 / 12 \\ &= 2 \frac{7}{12} \end{aligned}$$

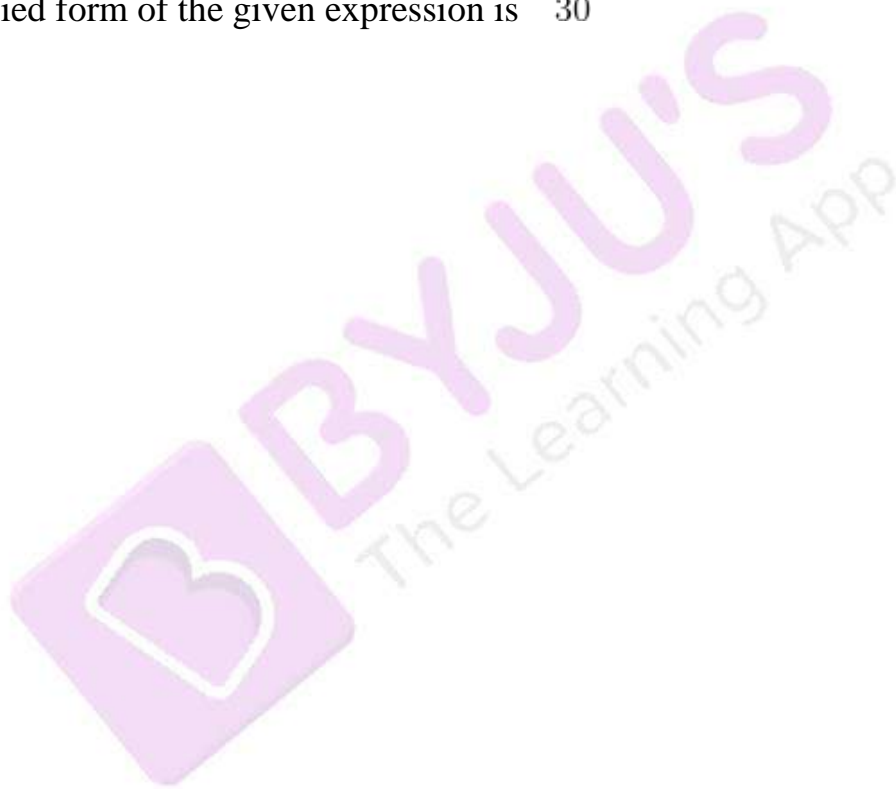
Hence, simplified form of the given expression is $2 \frac{7}{12}$

$$(v) 6 + 3/10 - 1\frac{8}{15}$$

The given expression can be simplified as below

$$\begin{aligned}6/1 + 3/10 - 23/15 &= (6 \times 30)/(1 \times 30) + (3 \times 3)/(10 \times 3) - (23 \times 2)/(15 \times 2) \\&= 180/30 + 9/30 - 46/30 \\&= (180 + 9 - 46)/30 \\&= 143/30 \\&= 4\frac{23}{30}\end{aligned}$$

Hence, simplified form of the given expression is $4\frac{23}{30}$



EXERCISE 14(D)

1. Simplify:

(i) $3/7 \times 2/5$

(ii) $4/9 \times 3/5$

(iii) $5/12 \times 8$

(iv) $7/6$ of $3/14$

(v) $3\frac{3}{8} \times 3\frac{6}{7}$

Solution:

(i) $3/7 \times 2/5$

The given expression can be simplified as below

$$\begin{aligned} 3/7 \times 2/5 &= (3 \times 2) / (7 \times 5) \\ &= 6/35 \end{aligned}$$

Hence, the simplified form of the given expression is $6/35$

(ii) $4/9 \times 3/5$

The given expression can be simplified as below

$$\begin{aligned} 4/9 \times 3/5 &= (4 \times 3) / (9 \times 5) \\ &= (4 \times 1) / (3 \times 5) \\ &= 4/15 \end{aligned}$$

Hence, the simplified form of the given expression is $4/15$

(iii) $5/12 \times 8$

The given expression can be simplified as below

$$\begin{aligned} 5/12 \times 8/1 &= (5 \times 8) / (12 \times 1) \\ &= (5 \times 2) / (3 \times 1) \\ &= 10/3 \\ &= 3\frac{1}{3} \end{aligned}$$

Hence, the simplified form of the given expression is $3\frac{1}{3}$

(iv) $7/6$ of $3/14$

The given expression can be simplified as below

$$\begin{aligned} 7/6 \times 3/14 &= (1 \times 1) / (2 \times 2) \\ &= 1/4 \end{aligned}$$

Hence, the simplified form of the given expression is $1/4$

(v) $3\frac{3}{8} \times 3\frac{6}{7}$

The given expression can be simplified as below

$$3\frac{3}{8} \times 3\frac{6}{7} = (27 \times 27) / (8 \times 7)$$

$$= 729 / 56$$

$$= 13\frac{1}{56}$$

Hence, the simplified form of the given expression is $13\frac{1}{56}$

2. Simplify:

(i) $2/3 \div 1\frac{1}{5}$

(ii) $4\frac{1}{2} \div 4/9$

(iii) $1 \div 2/5$

(iv) $4/9 \div 4/9$

(v) $2\frac{1}{3} \div 1\frac{3}{4}$

Solution:

(i) $2/3 \div 1\frac{1}{5}$

The given expression can be simplified as below

$$2/3 \div 6/5 = (2 \times 5) / (3 \times 6)$$

$$= 5/9$$

Hence, the simplified form of the given expression is $5/9$

(ii) $4\frac{1}{2} \div 4/9$

The given expression can be simplified as below

$$9/2 \div 4/9 = (9 \times 9) / (2 \times 4)$$

$$= 81/8$$

$$= 10\frac{1}{8}$$

Hence, the simplified form of the given expression is $10\frac{1}{8}$

(iii) $1 \div 2/5$

The given expression can be simplified as below

$$1/1 \div 2/5 = (1 \times 5) / (1 \times 2)$$

$$= 5/2$$

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

Hence, the simplified form of the given expression is $2\frac{1}{2}$

(iv) $4/9 \div 4/9$

The given expression can be simplified as below

$$4/9 \div 4/9 = (4 \times 9) / (9 \times 4)$$

$$= 1$$

Hence, the simplified form of the given expression is 1

$$(v) 2\frac{1}{3} \div 1\frac{3}{4}$$

The given expression can be simplified as below

$$2\frac{1}{3} \div 1\frac{3}{4} = (7 \times 4) / (3 \times 7)$$

$$= 4/3$$

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

Hence, the simplified form of the given expression is $1\frac{1}{3}$

3. Simplify:

$$(i) 1/4 \text{ of } 2\frac{2}{7} \div 3/5$$

$$(ii) 1\frac{1}{4} \times 1/2 \div 1\frac{1}{3}$$

$$(iii) 6\frac{1}{7} \times 0 \times 5\frac{3}{8}$$

$$(iv) 3/4 \times 1\frac{1}{3} \div 3/7 \text{ of } 2\frac{5}{8}$$

$$(v) 2\frac{1}{4} \div 2/7 \text{ of } 1\frac{1}{3} \times 2/3$$

Solution:

$$(i) 1/4 \text{ of } 2\frac{2}{7} \div 3/5$$

The given expression can be simplified as follows:

$$1/4 \times 16/7 \div 3/5 = 4/7 \div 3/5$$

$$= (4 \times 5) / (7 \times 3)$$

$$= 20/21$$

Hence, 20/21 is the simplified form of the given expression

$$(ii) 1\frac{1}{4} \times 1/2 \div 1\frac{1}{3}$$

The given expression can be simplified as follows

$$1\frac{1}{4} \times 1/2 \div 1\frac{1}{3} = 5/4 \times 1/2 \times 3/4$$

$$= 5/8 \times 3/4$$

$$= 15 / 32$$

Hence, $15 / 32$ is the simplified form of the given expression

$$(iii) 6\frac{1}{7} \times 0 \times 5\frac{3}{8}$$

The given expression can be simplified as follows

$$6\frac{1}{7} \times 0 \times 5\frac{3}{8} = (43 \times 0 \times 43) / (7 \times 0 \times 8)$$

$$= 0$$

Hence, 0 is the simplified form of the given expression

$$(iv) 3/4 \times 1\frac{1}{3} \div 3/7 \text{ of } 2\frac{5}{8}$$

The given expression can be simplified as follows

$$3/4 \times 1\frac{1}{3} \div 3/7 \text{ of } 2\frac{5}{8} = 3/4 \times 4/3 \div 9/8$$

$$\because 3/7 \text{ of } 2\frac{5}{8} = 3/7 \times 21/8 = 9/8$$

$$= 3/4 \times 4/3 \times 8/9$$

$$= 8/9$$

Hence, $8/9$ is the simplified form of the given expression

$$(v) 2\frac{1}{4} \div 2/7 \text{ of } 1\frac{1}{3} \times 2/3$$

The given expression can be simplified as follows

$$[2/7 \text{ of } 1\frac{1}{3} = 2/7 \times 4/3 = 8/21]$$

We get

$$= 9/4 \div 8/21 \times 2/3$$

$$= 9/4 \times 21/8 \times 2/3$$

$$= 63/16$$

$$= 3\frac{15}{16}$$

Hence, $3\frac{15}{16}$ is the simplified form of the given expression

4. Simplify:

$$(i) 5 - (8/11 - 3\frac{3}{11})$$

$$(ii) 1/2 \div (7/8 - 3/5)$$

$$(iii) 2\frac{1}{3} \div (5\frac{1}{2} + 3\frac{3}{4})$$

(iv) $(3\frac{7}{8} - 3\frac{3}{5}) \div 1/2$

(v) $4/7 \div (1/3 \times 2\frac{4}{5})$

Solution:

(i) $5 - (8/11 - 3\frac{3}{11})$

The given expression can be simplified as below

$$\begin{aligned} 5 - (8/11 - 3\frac{3}{11}) &= 5 - (8/11 - 36/11) \\ &= 5 - (8 - 36)/11 \\ &= 5 - (-28/11) \end{aligned}$$

On further calculation, we get

$$\begin{aligned} &= 5/1 + 28/11 \\ &= 83/11 \\ &= 7\frac{6}{11} \end{aligned}$$

Hence, $7\frac{6}{11}$ is the simplified form of the given expression

(ii) $1/2 \div (7/8 - 3/5)$

The given expression can be simplified as below

$$\begin{aligned} 1/2 \div (7/8 - 3/5) &= 1/2 \div (5 \times 7 - 8 \times 3)/40 \\ &= 1/2 \div (35 - 24)/40 \\ &= 1/2 \div (11/40) \\ &= 1/2 \times 40/11 \end{aligned}$$

We get

$$\begin{aligned} &= 20/11 \\ &= 1\frac{9}{11} \end{aligned}$$

Hence, $1\frac{9}{11}$ is the simplified form of the given expression

(iii) $2\frac{1}{3} \div (5\frac{1}{2} + 3\frac{3}{4})$

The given expression can be simplified as below

$$\begin{aligned} 2\frac{1}{3} \div (5\frac{1}{2} + 3\frac{3}{4}) &= 7/3 \div (11/2 + 15/4) \\ &= 7/3 \div (2 \times 11 + 1 \times 15)/4 \end{aligned}$$

On further calculation, we get

$$= 7/3 \div (22 + 15)/4$$

$$= 7/3 \div (37/4)$$

$$= 7/3 \times 4/37$$

$$= 28/111$$

Hence, 28 / 111 is the simplified form of the given expression

$$(iv) (3\frac{7}{8} - 3\frac{3}{5}) \div 1/2$$

The given expression can be simplified as below

$$(3\frac{7}{8} - 3\frac{3}{5}) \div 1/2 = (31/8 - 18/5) \div 1/2$$

By taking LCM, we get

$$= [(31 \times 5 - 18 \times 8) / (8 \times 5)] \div 1/2$$

$$= (155 - 144) / 40 \div 1/2$$

$$= (11/40) \div 1/2$$

By calculating further, we get

$$= 11/40 \times 2/1$$

$$= 11/20$$

Hence, 11 / 20 is the simplified form of the given expression

$$(v) 4/7 \div (1/3 \times 2\frac{4}{5})$$

The given expression can be simplified as below

$$4/7 \div (1/3 \times 2\frac{4}{5}) = 4/7 \div (1/3 \times 14/5)$$

$$= 4/7 \div (14/15)$$

On further calculation, we get

$$= 4/7 \times 15/14$$

$$= 2/7 \times 15/7$$

$$= 30/49$$

Hence, 30 / 49 is the simplified form of the given expression

5. Simplify

$$(i) (1/2 + 1/3) \div (1/4 - 1/6)$$

$$(ii) (24/35 \div 6/7 + 5/9) \times 3/4$$

$$(iii) 3/4 \text{ of } 6\frac{1}{8} - 2/3 \text{ of } 2\frac{1}{4}$$

$$(iv) 7/30 \text{ of } (1/3 + 7/15) \div (5/6 - 3/5)$$

$$(v) 2\frac{1}{2} - 3\frac{1}{2} \times 1\frac{3}{4} + 2\frac{1}{2}$$

Solution:

$$(i) (1/2 + 1/3) \div (1/4 - 1/6)$$

The given expression can be simplified as follows

$$(1/2 + 1/3) \div (1/4 - 1/6) = [(3 + 2)/6] \div [(3 - 2)/12]$$

On further calculation, we get

$$= (5/6) \div (1/12)$$

$$= 5/6 \times 12/1$$

$$= 5 \times 2$$

$$= 10$$

Hence, the simplified form of the given expression is 10

(ii) $(24/35 \div 6/7 + 5/9) \times 3/4$

The given expression can be simplified as follows

$$(24/35 \div 6/7 + 5/9) \times 3/4 = (24/35 \times 7/6 + 5/9) \times 3/4$$

$$= (4/5 + 5/9) \times 3/4$$

By taking LCM, we get

$$= [(36 + 25)/45] \times 3/4$$

$$= (61/45) \times 3/4$$

We get

$$= 61/60$$

$$= 1\frac{1}{60}$$

Hence, the simplified form of the given expression is $1\frac{1}{60}$

(iii) $3/4$ of $6\frac{1}{8}$ - $2/3$ of $2\frac{1}{4}$

The given expression can be simplified as below

$$3/4 \text{ of } 6\frac{1}{8} - 2/3 \text{ of } 2\frac{1}{4} = 3/4 \text{ of } 49/8 - 2/3 \text{ of } 9/4$$

$$= 3/4 \times 49/8 - 2/3 \text{ of } 9/4$$

$$= 147/32 - 2/3 \times 9/4$$

We get

$$= 147/32 - 3/2$$

On taking LCM, we get

$$= [(147 - 48)]/32$$

$$= 99/32$$

$$= 3\frac{3}{32}$$

Hence, the simplified form of the given expression is $3\frac{3}{32}$

(iv) $7/30$ of $(1/3 + 7/15) \div (5/6 - 3/5)$

The given expression can be simplified as below

$$7/30 \text{ of } (1/3 + 7/15) \div (5/6 - 3/5) = 7/30 \text{ of } [(5 + 7)/15] \div [(25 - 18)/30]$$

We get

$$\begin{aligned} &= 7/30 \text{ of } (4/5) \div (7/30) \\ &= 7/30 \times 4/5 \times 30/7 \\ &= 4/5 \end{aligned}$$

Hence, the simplified form of the given expression is $4/5$

(v) $2\frac{1}{2} - 3\frac{1}{2} \times 1\frac{3}{4} + 2\frac{1}{2}$

The given expression can be simplified as below

$$2\frac{1}{2} - 3\frac{1}{2} \times 1\frac{3}{4} + 2\frac{1}{2} = 5/2 - 7/2 \times 7/4 + 5/2$$

$$= 5/2 - 49/8 + 5/2$$

$$= 5/2 + 5/2 - 49/8$$

By taking LCM, we get

$$= (20 + 20 - 49) / 8$$

$$= (40 - 49) / 8$$

$$= -9/8$$

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

Hence, $-1\frac{1}{8}$ is the simplified form of the given expression

EXERCISE 14(E)

1. From a rope of $10\frac{1}{2}$ m long, $4\frac{5}{8}$ m is cut off. Find the length of the remaining rope

Solution:

Given

$$\text{Length of the rope} = 10\frac{1}{2} \text{ m}$$

$$\text{Length of cut off rope} = 4\frac{5}{8} \text{ m}$$

$$\text{Remaining rope} = 10\frac{1}{2} - 4\frac{5}{8}$$

We get

$$= 21/2 - 37/8$$

By taking LCM, we get

$$= (84 - 37) / 8$$

$$= 47 / 8 \text{ m}$$

$$= 5\frac{7}{8}$$

Hence, the length of the remaining rope is $5\frac{7}{8}$ m

2. A piece of cloth is 5 metre long. After washing, it shrinks by $1/25$ of its length. What is the length of the cloth after washing?

Solution:

Given

$$\text{Length of piece of cloth} = 5 \text{ metre}$$

After washing, it shrinks by $= 1/25$ of its length

Hence, the shranked cloth can be calculated as below

$$\text{Shranked cloth} = 1/25 \text{ of } 5 \text{ m}$$

$$= 1/5 \text{ m}$$

Hence, length of cloth after washing can be calculated as below

$$\text{Length of cloth after washing} = 5 - 1/5$$

By taking LCM, we get

$$= (25 - 1) / 5$$

$$= 24 / 5$$

$$= 4\frac{4}{5} \text{ m}$$

Hence the length of cloth after washing is $4\frac{4}{5}$ m

3. I bought wheat worth Rs $12\frac{1}{2}$, rice worth Rs $25\frac{3}{4}$ and vegetables worth Rs $10\frac{1}{4}$. If I gave a hundred-rupee note to the shopkeeper; how much did he return to me

Solution:

Given

$$\text{Wheat} = \text{Rs } 12\frac{1}{2}$$

$$\text{Rice} = \text{Rs } 25\frac{3}{4}$$

$$\text{Vegetables} = \text{Rs } 10\frac{1}{4}$$

Hence, total amount used to purchase the goods can be calculated as below

$$\text{Total amount of goods} = \text{Rs } \left(12\frac{1}{2} + 25\frac{3}{4} + 10\frac{1}{4} \right)$$

We get

$$= 25 / 2 + 103 / 4 + 41 / 4$$

$$= \text{Rs } 194 / 4$$

Hence, money returned by shopkeeper can be calculated as below

$$\text{Money returned} = \text{Rs } (100 - 194 / 4)$$

By taking LCM, we get

$$= \text{Rs } (400 - 194) / 4$$

$$= \text{Rs } 103 / 2$$

$$= \text{Rs } 51\frac{1}{2}$$

Hence, money returned by the shopkeeper is Rs $51\frac{1}{2}$

4. Out of 500 oranges in a box, $3 / 25$ are rotten and $1 / 5$ are kept for some guests. How many oranges are left in the box?

Solution:

Given

$$\text{Number of oranges in a box} = 500$$

$$\text{Rotten oranges out of 500} = 3 / 25$$

$$\text{Oranges for guests out of 500} = 1 / 5$$

$$\text{Rotten oranges} = 3 / 25 \text{ of } 500$$

We get,

$$= 3 / 25 \times 500$$

$$= 60$$

$$\text{Oranges for guests} = 1 / 5 \text{ of } 500$$

We get,

$$= 1 / 5 \times 500$$

$$= 100$$

$$\text{Oranges left in box} = 500 - 60 - 100$$

$$= 340$$

Hence, 340 oranges are left in the box

5. An ornament piece is made of gold and copper. Its total weight is 96 g. If $1 / 12$ of the ornament is copper, find the weight of gold in it.

Solution:

Given

$$\text{Weight of an ornament} = 96 \text{ g}$$

$$\text{Weight of copper} = 1 / 12 \text{ of } 96 \text{ g}$$

$$\text{Weight of copper} = 1 / 12 \times 96$$

We get,

$$= 8 \text{ g}$$

$$\text{Weight of gold} = 96 - 8$$

$$= 88 \text{ g}$$

Hence, the weight of gold in ornament is 88 g

6. A girl did half of some work on Monday and one-third of it on Tuesday. How much will she have to do on Wednesday in order to complete the work?

Solution:

Given

Half of work is done on Monday and one-third on Tuesday by a girl

Let total work done by a girl is 1

$$\text{Work done on Monday} = 1 / 2$$

$$\text{Work done on Tuesday} = 1 / 3$$

Hence, remaining work done on Wednesday to complete the work is calculated as below

$$\text{Remaining work done} = 1 - [(1 / 2 + 1 / 3)]$$

Taking LCM, we get

$$= 1 - [(3 + 2) / 6]$$

$$= 1 - 5 / 6$$

$$= (6 - 5) / 6$$

$$= 1 / 6$$

Hence, work done by a girl on Wednesday to complete is $1 / 6$

7. A man spends $3 / 8$ of his money and still has Rs 720 left with him. How much money did he have at first?

Solution:

Given

Man spends $\frac{3}{8}$ of his money

Let us assume a man has Rs 1

Amount spent = $\frac{3}{8}$ of 1

We get,

$$= \text{Rs } \frac{3}{8}$$

Amount left = $1 - \frac{3}{8}$

We get,

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

$$= \text{Rs } \frac{5}{8}$$

Since $\frac{5}{8}$ of his total money = Rs 720

$$\therefore \text{Total money} = \text{Rs } (720 \times \frac{8}{5})$$

$$= \text{Rs } 5760 / 5$$

$$= \text{Rs } 1152$$

Hence, total money a man has is Rs 1152

8. In a school, $\frac{4}{5}$ of the students are boys, and the number of girls is 100. Find the number of boys

Solution:

Given

Total number of girls = 100

Number of boys = $\frac{4}{5}$

Let us assume the total number of boys and girls be x

Total number of boys = $\frac{4}{5}$ of x

We get,

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

According to question, total strength of school can be calculated as below

$$x - \frac{4x}{5} = 100$$

$$\frac{5x - 4x}{5} = 100$$

$$x = 500$$

Number of boys = Total strength – Girls

$$= 500 - 100$$

$$= 400$$

Hence number of boys are 400

9. After finishing $\frac{3}{4}$ of my journey, I find that 12 km of my journey is covered. How much distance is still left to be covered?

Solution:

Let x km be the total journey

Given that total distance covered = $\frac{3}{4}$ of the journey is 12 km

According to the question, the distance covered can be calculated as below

$$\frac{3}{4} \text{ of } x = 12 \text{ km}$$

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

$$x = 4 \times 4$$

$$x = 16 \text{ km}$$

$$\text{Remaining distance} = 16 - 12$$

$$= 4 \text{ km}$$

Hence, 4 km of distance is left to be covered

10. When Ajit travelled 15 km, he found that one-fourth of his journey was still left. What was the full length of the journey?

Solution:

Let the total journey = x km

Given total distance covered = 15 km

Journey left = $\frac{1}{4}$ of x

Hence, according to the question, the total distance of journey can be calculated as below

$$\frac{1}{4} \text{ of } x = x - 15$$

$$x - \frac{x}{4} = 15$$

By calculating further, we get

$$\frac{(4x - x)}{4} = 15$$

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

$$3x = 60$$

$$x = \frac{60}{3}$$

$$x = 20$$

Hence, the full length of the journey is 20 km

11. In a particular month, a man earns Rs 7, 200. Out of this income, he spends $\frac{3}{10}$ on food, $\frac{1}{4}$ on house rent, $\frac{1}{10}$ on insurance and $\frac{2}{25}$ on holidays. How much did he save in that month?

Solution:

Given

Money earned by a man in a particular month = Rs 7200

Amount spend on food, house rent, insurance and holidays by him are $\frac{3}{10}$, $\frac{1}{4}$, $\frac{1}{10}$ and $\frac{2}{25}$ respectively

Amount spend on food = $\frac{3}{10}$ of 7200

$$= \frac{3}{10} \times 7200$$

$$= 3 \times 720$$

$$= \text{Rs } 2160$$

Amount spend on house rent = $1 / 4$ of 7200

$$= 1 / 4 \times 7200$$

$$= \text{Rs } 1800$$

Amount spend on insurance = $1 / 10$ of 7200

$$= 1 / 10 \times 7200$$

$$= \text{Rs } 720$$

Amount spend on holidays = $2 / 25$ of 7200

$$= 2 / 25 \times 7200$$

$$= \text{Rs } 576$$

Total amount spend = Rs (2160 + 1800 + 720 + 576)

$$= \text{Rs } 5256$$

Amount saved by man = $7200 - 5256$

$$= \text{Rs } 1944$$

Hence, amount saved by a man in a month is Rs 1944

