



Fractions

Understanding the Lesson

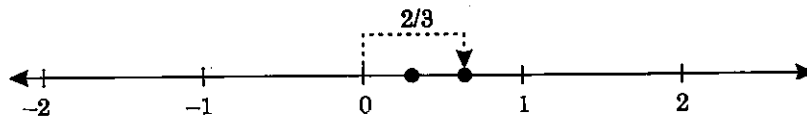
- Fraction as a part of whole.
- Representation of a fraction on number line.
- Proper, improper and mixed fractions.
- Comparison of fractions.
- Addition and subtraction of fractions.
- Equivalent fractions.
- Simplest form of a fraction.
- Like and unlike fraction.
- Ascending and descending order of a fraction.

Conceptual Facts

- A fraction is a part of a whole number having numerator and denominator. For example $\frac{5}{7}$, where 5 is numerator and 7 is the denominator.

- Representation of a fraction on a number line.

For example: $\frac{2}{3}$



- **Proper fractions:** Numerator is less than the denominator.

For example: $\frac{2}{3}$, $\frac{5}{8}$ and $\frac{1}{5}$

- **Improper fractions:** Numerator is bigger than the denominator.

For example: $\frac{5}{2}$, $\frac{7}{5}$, $\frac{10}{3}$ and $\frac{6}{5}$

- **Mixed fractions:** It is represented by Quotient $\frac{\text{Remainder}}{\text{Divisor}}$.

For example: $5\frac{1}{7}$, $3\frac{2}{3}$ and $4\frac{5}{7}$

- **Equivalent fractions:** Two or more fractions are said to be equivalent fractions, if they represent the same quantity.

For example: $\frac{2}{5}$, $\frac{6}{15}$, $\frac{4}{10}$ and $\frac{8}{20}$

- **Simplest form of a fraction:** A fraction is said to be simple if numerator and the denominator have no common factor except 1.

For example: Simplest form of $\frac{15}{20}$ is $\frac{3}{4}$.

- **Like fractions:** Two or more fractions having same denominators are called like fractions.

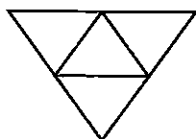
For example: $\frac{2}{5}, \frac{3}{5}, \frac{4}{5}, \frac{6}{5}$

- **Unlike fractions:** Two or more fractions having different denominators are called unlike fractions.

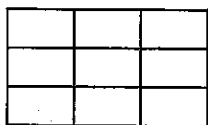
For example: $\frac{8}{9}, \frac{5}{7}, \frac{6}{5}, \frac{7}{10}$

EXERCISE 7.1

- Q1. Write the fraction representing the shaded portion.



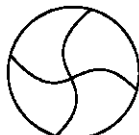
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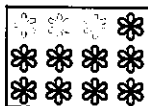
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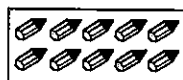
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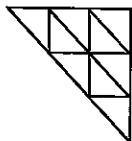
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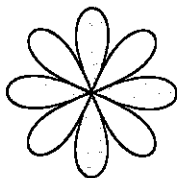
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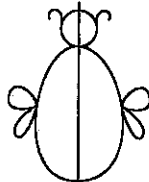
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(viii)



(ix)



(x)

- Sol. (i) Total number of parts = 4
Number of shaded parts = 2
 \therefore Fraction = $\frac{2}{4}$

- (ii) Total number of parts = 9
Number of shaded parts = 8
 \therefore Fraction = $\frac{8}{9}$

- (iii) Total number of parts = 8
Number of shaded parts = 4

$$\therefore \text{Fraction} = \frac{4}{8}$$

- (iv) Total number of parts = 4
Number of shaded parts = 1

$$\therefore \text{Fraction} = \frac{1}{4}$$

- (v) Total number of parts = 7
Number of shaded parts = 3

$$\therefore \text{Fraction} = \frac{3}{7}$$

- (vi) Total number of parts = 12
Number of shaded parts = 3

$$\therefore \text{Fraction} = \frac{3}{12}$$

- (vii) Total number of parts = 10
Number of shaded parts = 10

$$\therefore \text{Fraction} = \frac{10}{10}$$

- (viii) Total number of parts = 9
Number of shaded parts = 4

$$\therefore \text{Fraction} = \frac{4}{9}$$

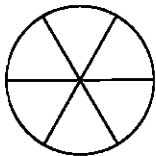
- (ix) Total number of parts = 8
Number of shaded parts = 4

$$\therefore \text{Fraction} = \frac{4}{8}$$

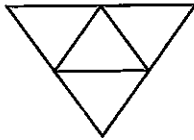
- (x) Total number of parts = 2
Number of shaded part = 1

$$\therefore \text{Fraction} = \frac{1}{2}$$

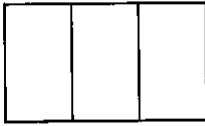
Q2. Colour the part according to the given fraction.



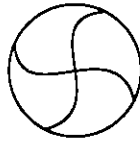
(i) $\frac{1}{6}$



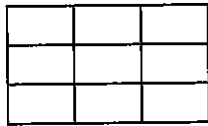
(ii) $\frac{1}{4}$



(iii) $\frac{1}{3}$

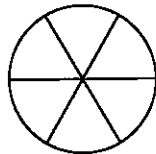


(iv) $\frac{3}{4}$

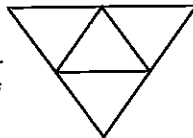


(v) $\frac{4}{9}$

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



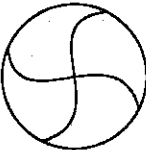
(ii) $\frac{1}{4}$



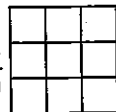
(iii) $\frac{1}{3}$



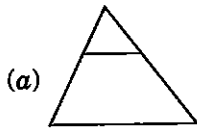
(iv) $\frac{3}{4}$



(v) $\frac{4}{9}$



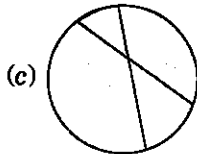
Q3. Identify the error, if any.



This is $\frac{1}{2}$



This is $\frac{1}{4}$



This is $\frac{3}{4}$

Sol. (a) Since the shaded part is not half.

\therefore This is not $\frac{1}{2}$.

(b) Since, the parts are not equal.

\therefore Shaded part is not $\frac{1}{4}$.

(c) Since, the part are not equal.

\therefore Shaded part is not $\frac{3}{4}$.

Q4. What fraction of a day is 8 hours?

Sol. Since, a day has 24 hours and we have 8 hours,

\therefore Required fraction = $\frac{8}{24}$

Q5. What fraction of a hour is 40 minutes?

Sol. Since 1 hours = 60 minutes

\therefore Fraction of 40 minutes = $\frac{40}{60}$

Q6. Arya, Abhimanyu and Vivek shared lunch. Arya has brought two sandwiches, one made of vegetable and one of Jam. The other two boys forgot to bring their lunch. Arya agreed to share his sandwiches so that each person will have an equal share of each sandwich.

(a) How can Arya divide his sandwiches so that each person has an equal share?

(b) What part of a sandwich will each boy receive?

Sol. (a) Arya has divided his sandwich into three equal parts.

So, each of them will get one part.

(b) Each one of them will receive $\frac{1}{3}$ part.

\therefore Required fraction = $\frac{1}{3}$

Q7. Kanchan dyes dresses. She had to dye 30 dresses. She has so far finished 20 dresses. What fraction of dresses has she finished?

Sol. Total number of dresses to be dyed = 30

Number of dresses finished = 20

\therefore Required fraction = $\frac{20}{30} = \frac{2}{3}$

Q8. Write the natural numbers from 2 to 12. What fraction of them are prime numbers?

Sol. Natural numbers between 2 and 12 are;

2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Number of given natural numbers = 11

Number of prime numbers = 5

\therefore Required fraction = $\frac{5}{11}$

Q9. Write the natural numbers from 102 to 113. What fraction of them are prime numbers?

Sol. Natural numbers from 102 to 113 are;

102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113

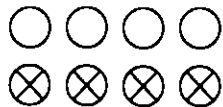
Total number of given natural numbers = 12

Prime numbers are 103, 107, 109, 113

\therefore Number of prime numbers = 4

\therefore Required fraction = $\frac{4}{12} = \frac{1}{3}$

Q10. What fraction of these circles have X's in them?



Sol. Total number of circles = 8
Number of circles having X's in them = 4

$$\therefore \text{Required fraction} = \frac{4}{8} = \frac{1}{2}$$

Q11. Kristin received a CD player for her birthday. She bought 3 CDs and received 5 others as gifts. What fraction of her total CDs did she buy and what fraction did she receive as gifts?

Sol. Number of CDs bought by her from the market = 3

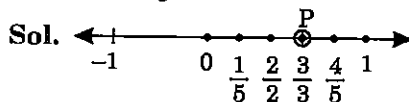
Number of CD's received as gifts = 5

$$\therefore \text{Total number of CDs} = 3 + 5 = 8$$

\therefore Fraction of CD (bought) = $\frac{3}{8}$ and the fraction of CDs (gifted) = $\frac{5}{8}$

TRY THESE (PAGE 137)

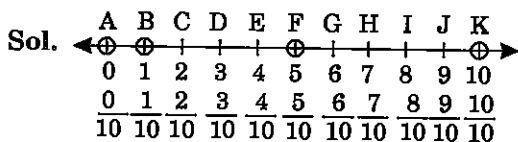
Q1. Show $\frac{3}{5}$ on a number line.



Divide the number line from 0 to 1 into 5 equal parts.

The point represents $\frac{3}{5}$.

Q2. Show $\frac{1}{10}$, $\frac{0}{10}$, $\frac{5}{10}$ and $\frac{10}{10}$ on a number line.



Divide the number line from 0 to 1 into 10 equal parts.

\therefore B represents $\frac{1}{10}$, A represents $\frac{0}{10}$,

F represents $\frac{5}{10}$ and K represents $\frac{10}{10}$.

Q3. Can you show any other fraction between 0 and 1? Write five more fractions that you can show and depict them on the number line.

Sol. Yes, we can show any number of fractions between 0 and 1.

Five more fractions between 0 and 1 that can be shown on number line are;

$$\frac{1}{3}, \frac{2}{5}, \frac{6}{7}, \frac{3}{8} \text{ and } \frac{1}{2}.$$

Q4. How many fractions lie between 0 and 1? Think, discuss and write your answer?

Sol. An infinite number of fractions can be found between 0 and 1.

TRY THESE (PAGE 138)

Q1. Give a proper fraction:

- whose numerator is 5 and denominator is 7.
- whose denominator is 9 and numerator is 5.
- whose numerator and denominator add up to 10. How many fractions of this kind can you make?
- whose denominator is 4 more than the numerator.
(Give any five. How many more can you make?)

Sol. (a) Given that:

Numerator = 5

Denominator = 7

$$\therefore \text{Fraction} = \frac{5}{7}$$

(b) Given that:

Numerator = 5

Denominator = 9

$$\therefore \text{Fraction} = \frac{5}{9}$$

(c) Numerator	Denominator	Sum of numerator and denominator	Fraction
0	10	$0 + 10 = 10$	$\frac{0}{10}$
1	9	$1 + 9 = 10$	$\frac{1}{9}$
2	8	$2 + 8 = 10$	$\frac{2}{8}$
3	7	$3 + 7 = 10$	$\frac{3}{7}$
4	6	$4 + 6 = 10$	$\frac{4}{6}$
5	5	$5 + 5 = 10$	$\frac{5}{5}$

∴ The fractions whose numerator and denominator add upto 10 are;

$$\frac{0}{10}, \frac{1}{9}, \frac{2}{8}, \frac{3}{7}, \frac{4}{6} \text{ and } \frac{5}{5}.$$

(d) We can find an infinite number of fractions whose denominator is 4 more than the numerator.

For example: $\frac{1}{5}, \frac{3}{7}, \frac{5}{9}, \frac{7}{11}$, etc.

Q2. A fraction is given.

How will you decide, by just looking at it, whether the fraction is

(a) less than 1? (b) equal to 1?

Sol. (a) If numerator is less than the denominator, then the fraction is less than 1.

For example: $\frac{2}{7}, \frac{1}{3}, \frac{3}{5}$, etc.

(b) If the numerator is equal to the denominator, then the fraction is equal to 1.

For example: $\frac{2}{2}, \frac{4}{4}, \frac{5}{5}$, etc.

Q3. Fill up using one of these '>', '<' or '='.

(a) $\frac{1}{2}$ 1

(b) $\frac{3}{5}$ 1

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

(d) $\frac{4}{4}$ 1

(e) $\frac{2005}{2005}$ 1

Sol. (a) $\frac{1}{2}$ 1

(b) $\frac{3}{5}$ 1

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

(d) $\frac{4}{4}$ 1

(e) $\frac{2005}{2005}$ 1

EXERCISE 7.2

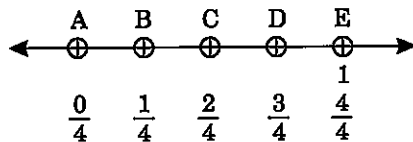
Q1. Draw number lines and locate the points on them.

(a) $\frac{1}{2}, \frac{1}{4}, \frac{3}{4}, \frac{4}{4}$

(b) $\frac{1}{8}, \frac{2}{8}, \frac{3}{8}, \frac{7}{8}$

(c) $\frac{2}{5}, \frac{3}{5}, \frac{8}{5}, \frac{4}{5}$

Sol. (a) $\frac{1}{2}, \frac{1}{4}, \frac{3}{4}, \frac{4}{4}$



We have divided the number line from 0 to 1 into four equal parts.

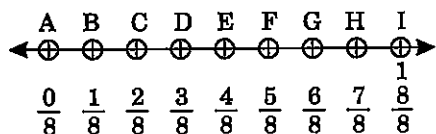
C represents $\frac{2}{4}$, i.e., $\frac{1}{2}$

B represents $\frac{1}{4}$

D represents $\frac{3}{4}$

and E represents $\frac{4}{4}$, i.e., 1.

(b) $\frac{1}{8}, \frac{2}{8}, \frac{3}{8}, \frac{7}{8}$



We have divided the number line from 0 to 1 into eight equal parts.

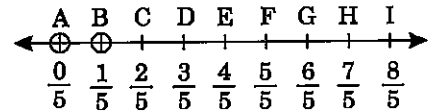
B represents $\frac{1}{8}$

C represents $\frac{2}{8}$

D represents $\frac{3}{8}$

and H represents $\frac{7}{8}$

(c) $\frac{2}{5}, \frac{3}{5}, \frac{8}{5}, \frac{4}{5}$



From the above number line, we have

C represents $\frac{2}{5}$

D represents $\frac{3}{5}$

E represents $\frac{4}{5}$

and I represents $\frac{8}{5}$

Q2. Express the following as mixed fractions:

(a) $\frac{20}{3}$

(b) $\frac{11}{5}$

(c) $\frac{17}{7}$

(d) $\frac{28}{5}$

(e) $\frac{19}{6}$

(f) $\frac{35}{9}$

Sol. (a) $\frac{20}{3}$

We have,

$$\begin{array}{r} 3 \overline{)20} \text{ (6} \\ -18 \\ \hline 2 \end{array}$$

$$\therefore \frac{20}{3} = 6\frac{2}{3}$$

(b) $\frac{11}{5}$

We have,

$$\begin{array}{r} 5 \overline{)11} \text{ (2} \\ -10 \\ \hline 1 \end{array}$$

$$\therefore \frac{11}{5} = 2\frac{1}{5}$$

(c) $\frac{17}{7}$

We have,

$$\begin{array}{r} 7 \overline{)17} \text{ (2} \\ -14 \\ \hline 3 \end{array}$$

$$\therefore \frac{17}{7} = 2\frac{3}{7}$$

Q3. Express the following as improper fractions:

(a) $7\frac{3}{4}$

(b) $5\frac{6}{7}$

(c) $2\frac{5}{6}$

(d) $10\frac{3}{5}$

(e) $9\frac{3}{7}$

(f) $8\frac{4}{9}$

Sol. (a) $7\frac{3}{4} = \frac{7 \times 4 + 3}{4} = \frac{31}{4} \therefore 7\frac{3}{4} = \frac{31}{4}$

(b) $5\frac{6}{7} = \frac{5 \times 7 + 6}{7} = \frac{41}{7} \therefore 5\frac{6}{7} = \frac{41}{7}$

(c) $2\frac{5}{6} = \frac{2 \times 6 + 5}{6} = \frac{17}{6} \therefore 2\frac{5}{6} = \frac{17}{6}$

(d) $10\frac{3}{5} = \frac{10 \times 5 + 3}{5} = \frac{53}{5} \therefore 10\frac{3}{5} = \frac{53}{5}$

(e) $9\frac{3}{7} = \frac{9 \times 7 + 3}{7} = \frac{66}{7} \therefore 9\frac{3}{7} = \frac{66}{7}$

(f) $8\frac{4}{9} = \frac{8 \times 9 + 4}{9} = \frac{76}{9} \therefore 8\frac{4}{9} = \frac{76}{9}$

TRY THESE (PAGE 142)

Q1. Are $\frac{1}{3}$ and $\frac{2}{7}$; $\frac{2}{5}$ and $\frac{2}{7}$; $\frac{2}{9}$ and $\frac{6}{27}$ equivalent?

Give reason.

(d) $\frac{28}{5}$

We have,

$$\begin{array}{r} 5 \overline{)28} \text{ (5} \\ -25 \\ \hline 3 \end{array}$$

$$\therefore \frac{28}{5} = 5\frac{3}{5}$$

(e) $\frac{19}{6}$

We have,

$$\begin{array}{r} 6 \overline{)19} \text{ (3} \\ -18 \\ \hline 1 \end{array}$$

$$\therefore \frac{19}{6} = 3\frac{1}{6}$$

(f) $\frac{35}{9}$

We have,

$$\begin{array}{r} 9 \overline{)35} \text{ (3} \\ -27 \\ \hline 8 \end{array}$$

$$\therefore \frac{35}{9} = 3\frac{8}{9}$$

Sol. (i) $\frac{1}{3}$ and $\frac{2}{7}$

We have $1 \times 7 = 7$ and $2 \times 3 = 6$

Since $7 \neq 6$

$\therefore \frac{1}{3}$ and $\frac{2}{7}$ are not equivalent fractions.

(ii) $\frac{2}{5}$ and $\frac{2}{7}$

We have, $2 \times 7 = 14$, $2 \times 5 = 10$

Since $14 \neq 10$

$\therefore \frac{2}{5}$ and $\frac{2}{7}$ are not equivalent fractions.

(iii) $\frac{2}{9}$ and $\frac{6}{27}$

We have, $2 \times 27 = 54$, $6 \times 9 = 54$

Since $54 = 54$

$\therefore \frac{2}{9}$ and $\frac{6}{27}$ are equivalent fractions.

Q2. Give example of four equivalent fractions.

Sol. The following pair of fractions are equivalent

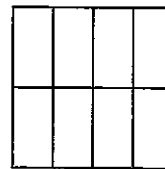
(i) $\frac{1}{2}$ and $\frac{4}{8}$

(ii) $\frac{3}{7}$ and $\frac{6}{14}$

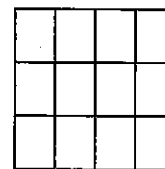
(iii) $\frac{5}{9}$ and $\frac{15}{27}$

(iv) $\frac{6}{11}$ and $\frac{12}{22}$

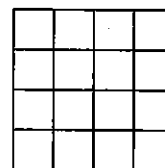
Q3. Identify the fractions in each. Are these fractions equivalent?



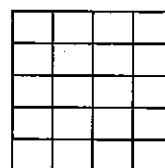
(i)



(ii)



(iii)



(iv)

(i) Figure represents $\frac{6}{8} = \frac{6 \div 2}{8 \div 2} = \frac{3}{4}$

(ii) Figure represents $\frac{9}{12} = \frac{9 \div 3}{12 \div 3} = \frac{3}{4}$

(iii) Figure represents $\frac{12}{16} = \frac{12 \div 4}{16 \div 4} = \frac{3}{4}$

(iv) Figure represents $\frac{15}{20} = \frac{15 \div 5}{20 \div 5} = \frac{3}{4}$

Since all the fraction $\frac{6}{8}, \frac{9}{12}, \frac{12}{16}$ and $\frac{15}{20}$ are equal to $\frac{3}{4}$.

\therefore They are equivalent fractions.

TRY THESE (PAGE 143)

Q1. Find five equivalent fractions of each of the following:

(i) $\frac{2}{3}$

(ii) $\frac{1}{5}$

(iii) $\frac{3}{5}$

(iv) $\frac{5}{9}$

Sol. (i) $\frac{2}{3} = \frac{2 \times 2}{3 \times 2} = \frac{4}{6}$ $\frac{2}{3} = \frac{2 \times 3}{3 \times 3} = \frac{6}{9}$

$\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$ $\frac{2}{3} = \frac{2 \times 5}{3 \times 5} = \frac{10}{15}$

$\frac{2}{3} = \frac{2 \times 6}{3 \times 6} = \frac{12}{18}$

So, $\frac{2}{3}, \frac{4}{6}, \frac{6}{9}, \frac{8}{12}, \frac{10}{15}$ and $\frac{12}{18}$ are equivalent fractions.

(ii) $\frac{1}{5} = \frac{1 \times 2}{5 \times 2} = \frac{2}{10}$ $\frac{1}{5} = \frac{1 \times 3}{5 \times 3} = \frac{3}{15}$

$\frac{1}{5} = \frac{1 \times 4}{5 \times 4} = \frac{4}{20}$ $\frac{1}{5} = \frac{1 \times 5}{5 \times 5} = \frac{5}{25}$

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

So, $\frac{1}{5}, \frac{2}{10}, \frac{3}{15}, \frac{4}{20}, \frac{5}{25}$ and $\frac{6}{30}$ are equivalent fractions.

(iii), (iv) Try Yourself.

TRY THESE (PAGE 146)

Q1. Write the simplest form of:

(i) $\frac{15}{75}$ (ii) $\frac{16}{72}$ (iii) $\frac{17}{51}$

(iv) $\frac{42}{28}$ (v) $\frac{80}{24}$

Sol. (i) $\frac{15}{75}$

We have, $15 = 3 \times 5$

$75 = 3 \times 5 \times 5$

\therefore HCF of 15 and 75 = $3 \times 5 = 15$

$\therefore \frac{15}{75} = \frac{15 \div 15}{75 \div 15} = \frac{1}{5}$

So, the simplest form of $\frac{15}{75} = \frac{1}{5}$

(ii) $\frac{16}{72}$

We have, $16 = 2 \times 2 \times 2 \times 2$

$72 = 2 \times 2 \times 2 \times 3 \times 3$

\therefore HCF of 16 and 72 = $2 \times 2 \times 2 = 8$

$\therefore \frac{16}{72} = \frac{16 \div 8}{72 \div 8} = \frac{2}{9}$

So, $\frac{16}{72} = \frac{2}{9}$

(iii) $\frac{17}{51}$

We have, $17 = 1 \times 17$

$51 = 3 \times 17$

\therefore HCF of 17 and 51 = 17

$\therefore \frac{17}{51} = \frac{17 \div 17}{51 \div 17} = \frac{1}{3}$

(iv) $\frac{42}{28}$

We have, $42 = 2 \times 3 \times 7$

$28 = 2 \times 2 \times 7$

\therefore HCF of 42 and 28 = $2 \times 7 = 14$

$\therefore \frac{42}{28} = \frac{42 \div 14}{28 \div 14} = \frac{3}{2}$

So, $\frac{42}{28} = \frac{3}{2}$

(v) $\frac{80}{24}$

We have, $80 = 2 \times 2 \times 2 \times 2 \times 5$

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

\therefore HCF of 80 and 24 = $2 \times 2 \times 2 = 8$

$\therefore \frac{80}{24} = \frac{80 \div 8}{24 \div 8} = \frac{10}{3}$

So, $\frac{80}{24} = \frac{10}{3}$

Q2. Is $\frac{49}{64}$ in its simplest form?

Sol. $\frac{49}{64}$

We have, factors of 49 = 1, 7 and 49

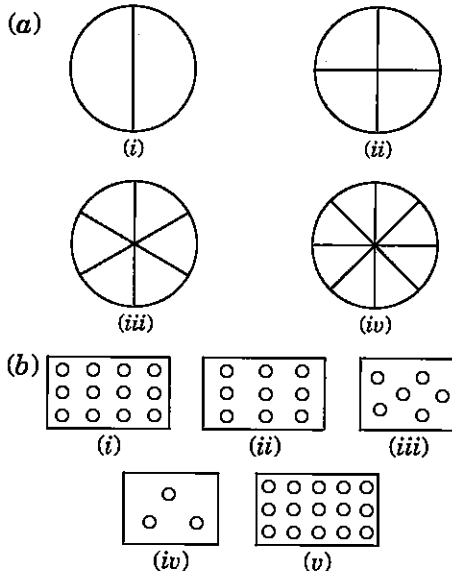
Factors of 64 = 1, 2, 4, 8, 16, 32 and 64.

Common factor of 49 and 64 is 1.

$\therefore \frac{49}{64}$ is in its simplest form.

EXERCISE 7.3

Q1. Write the fractions. Are all these fractions equivalent?



Sol. (a) (i) Shaded part = $\frac{1}{2}$

(ii) Shaded part = $\frac{2}{4} = \frac{2 \div 2}{4 \div 2} = \frac{1}{2}$

(iii) Shaded part = $\frac{3}{6} = \frac{3 \div 3}{6 \div 3} = \frac{1}{2}$

(iv) Shaded part = $\frac{4}{8} = \frac{4 \div 4}{8 \div 4} = \frac{1}{2}$

\therefore All fractions are equivalent.

(b) (i) Shaded part = $\frac{4}{12} = \frac{4 \div 4}{12 \div 4} = \frac{1}{3}$

(ii) Shaded part = $\frac{3}{9} = \frac{3 \div 3}{9 \div 3} = \frac{1}{3}$

(iii) Shaded part = $\frac{2}{6} = \frac{2 \div 2}{6 \div 2} = \frac{1}{3}$

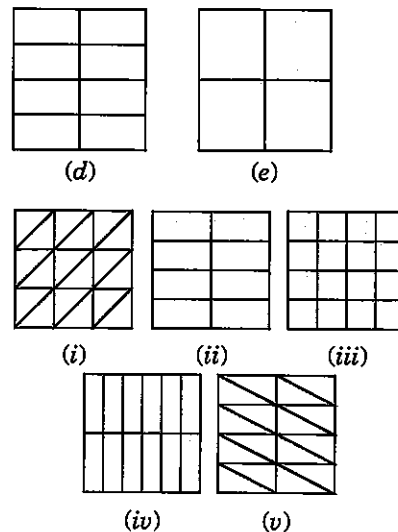
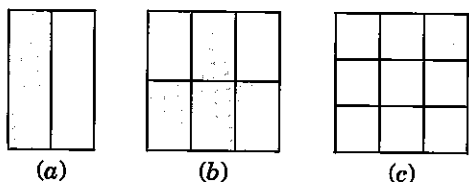
(iv) Shaded part = $\frac{1}{3}$

(v) Shaded part = $\frac{6}{15} = \frac{6 \div 3}{15 \div 3} = \frac{2}{5}$

Since all the fractions in their simplest form are not equal.

\therefore They are not equivalent fractions.

Q2. Write the fractions and pair up the equivalent fractions from each row.



Sol. (a) $\frac{1}{2}$

(b) $\frac{4}{6} = \frac{4 \div 2}{6 \div 2} = \frac{2}{3}$

(c) $\frac{3}{9} = \frac{3 \div 3}{9 \div 3} = \frac{1}{3}$

(d) $\frac{2}{8} = \frac{2 \div 2}{8 \div 2} = \frac{1}{4}$

(e) $\frac{3}{4}$

(i) $\frac{6}{18} = \frac{6 \div 6}{18 \div 6} = \frac{1}{3}$

(ii) $\frac{4}{8} = \frac{4 \div 4}{8 \div 4} = \frac{1}{2}$

(iii) $\frac{12}{16} = \frac{12 \div 4}{16 \div 4} = \frac{3}{4}$

(iv) $\frac{8}{12} = \frac{8 \div 4}{12 \div 4} = \frac{2}{3}$

(v) $\frac{4}{16} = \frac{4 \div 4}{16 \div 4} = \frac{1}{4}$

The following pairs represent the equivalent fractions:

(a) and (ii) = $\frac{1}{2}$

(b) and (iv) = $\frac{2}{3}$

(c) and (i) = $\frac{1}{3}$

(d) and (v) = $\frac{1}{4}$

(e) and (iii) = $\frac{3}{4}$

Q3. Replace \square in each of the following by the correct number:

(a) $\frac{2}{7} = \frac{8}{\square}$

(b) $\frac{5}{8} = \frac{10}{\square}$

(c) $\frac{3}{5} = \frac{\square}{20}$

(d) $\frac{45}{60} = \frac{15}{\square}$

(e) $\frac{18}{24} = \frac{\square}{4}$

Sol. (a) Given that:

$$\frac{2}{7} = \frac{8}{\square}$$

$$\Rightarrow 2 \times \square = 7 \times 8 \Rightarrow \square = \frac{7 \times 8}{2} = 28$$

$$\therefore \frac{2}{7} = \frac{8}{\boxed{28}}$$

(b) Given that: $\frac{5}{8} = \frac{10}{\square} \Rightarrow 5 \times \square = 8 \times 10$

$$\Rightarrow \square = \frac{8 \times 10}{5} = 16$$

$$\therefore \frac{5}{8} = \frac{10}{\boxed{16}}$$

(c) Given that: $\frac{3}{5} = \frac{\square}{20} \Rightarrow 5 \times \square = 3 \times 20$

$$\Rightarrow \square = \frac{3 \times 20}{5} = 12$$

$$\therefore \frac{3}{5} = \frac{\boxed{12}}{20}$$

(d) Given that: $\frac{45}{60} = \frac{15}{\square} \Rightarrow 45 \times \square = 15 \times 60$

$$\Rightarrow \square = \frac{15 \times 60}{45} = 20$$

$$\therefore \frac{45}{60} = \frac{15}{\boxed{20}}$$

(e) Given that: $\frac{18}{24} = \frac{\square}{4} \Rightarrow 24 \times \square = 18 \times 4$

$$\Rightarrow \square = \frac{18 \times 4}{24} = 3$$

$$\therefore \frac{18}{24} = \frac{\boxed{3}}{4}$$

Q4. Find the equivalent fraction of $\frac{3}{5}$ having

- (a) denominator 20 (b) numerator 9
(c) denominator 30 (d) numerator 27

Sol. (a) Here, we require denominator 20.

Let N be the numerator of the fractions.

$$\therefore \frac{N}{20} = \frac{3}{5} \Rightarrow 5 \times N = 20 \times 3$$

$$\Rightarrow N = \frac{20 \times 3}{5} = 12$$

\therefore The required fraction is $\frac{12}{20}$.

(b) Here, we required numerator 9.

Let D be the denominator of the fraction.

$$\therefore \frac{9}{D} = \frac{3}{5} \Rightarrow 3 \times D = 9 \times 5$$

$$\Rightarrow D = \frac{9 \times 5}{3} = 15$$

\therefore The required fraction is $\frac{9}{15}$.

(c) Here, we required denominator 30.

Let N be the numerator of the fraction.

$$\therefore \frac{N}{30} = \frac{3}{5} \Rightarrow 5 \times N = 3 \times 30$$

$$\Rightarrow N = \frac{3 \times 30}{5} = 18$$

\therefore The required fraction is $\frac{18}{30}$.

(d) Here, we required numerator 27.

Let D be the denominator of the fraction.

$$\therefore \frac{27}{D} = \frac{3}{5} \Rightarrow 3 \times D = 5 \times 27$$

$$\Rightarrow D = \frac{5 \times 27}{3} = 45$$

\therefore The required fraction is $\frac{27}{45}$.

Q5. Find the equivalent fraction of $\frac{36}{48}$ with

- (a) numerator 9 (b) denominator 4

Sol. (a) Given that numerator = 9

$$\therefore \frac{9}{D} = \frac{36}{48} \Rightarrow D \times 36 = 9 \times 48$$

$$\Rightarrow D = \frac{9 \times 48}{36} = 12$$

So, the equivalent fraction is $\frac{9}{12}$.

(b) Given that denominator = 4

$$\therefore \frac{N}{4} = \frac{36}{48} \Rightarrow N \times 48 = 4 \times 36$$

$$\Rightarrow N = \frac{4 \times 36}{48} = 3$$

So, the equivalent fraction is $\frac{3}{4}$.

Q6. Check whether the given fractions are equivalent:

(a) $\frac{5}{9}, \frac{30}{54}$ (b) $\frac{3}{10}, \frac{12}{50}$ (c) $\frac{7}{13}, \frac{5}{11}$

Sol. (a) $\frac{5}{9}$ and $\frac{30}{54}$

We have $5 \times 54 = 270$

and $9 \times 30 = 270$

Here $5 \times 54 = 9 \times 30$

$\therefore \frac{5}{9}$ and $\frac{30}{54}$ are equivalent fractions.

(b) $\frac{3}{10}$ and $\frac{12}{50}$

We have $3 \times 50 = 150$

and $10 \times 12 = 120$

Here $3 \times 50 \neq 10 \times 12$

$\therefore \frac{3}{10}$ and $\frac{12}{50}$ are not equivalent fractions.

(c) $\frac{7}{13}$ and $\frac{5}{11}$

We have $7 \times 11 = 77$ and $5 \times 13 = 65$

Here $7 \times 11 \neq 5 \times 13$

$\therefore \frac{7}{13}$ and $\frac{5}{11}$ are not equivalent fractions.

Q7. Reduce the following fractions to simplest form:

(a) $\frac{48}{60}$ (b) $\frac{150}{60}$ (c) $\frac{84}{98}$

(d) $\frac{12}{52}$ (e) $\frac{7}{28}$

Sol. (a) $\frac{48}{60}$

We have

48 = 1, 2, 3, 4, 6, 8, $\textcircled{12}$, 16, 24, 48

60 = 1, 2, 3, 4, 5, 6, 10, $\textcircled{12}$, 15, 20, 30, 60

\therefore HCF = 12

So, $\frac{48 \div 12}{60 \div 12} = \frac{4}{5}$

Hence, $\frac{48}{60} = \frac{4}{5}$

(b) $\frac{150}{60}$

We have

150 = 1, 2, 3, 5, 6, 10, 15, 25, $\textcircled{30}$, 50, 75, 150

60 = 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, $\textcircled{30}$, 60

\therefore HCF = 30

So, $\frac{150 \div 30}{60 \div 30} = \frac{5}{2}$

Hence, $\frac{150}{60} = \frac{5}{2}$

(c) $\frac{84}{98}$

We have

84 = 1, 2, 3, 4, 6, 7, 12, $\textcircled{14}$, 21, 28, 42, 84

98 = 1, 2, 7, $\textcircled{14}$, 49, 98

\therefore HCF = 14

So, $\frac{84 \div 14}{98 \div 14} = \frac{6}{7}$

Hence, $\frac{84}{98} = \frac{6}{7}$

(d) $\frac{12}{52}$

We have $12 = 1, 2, 3, \textcircled{4}, 6, 12$

$52 = 1, 2, \textcircled{4}, 13, 26, 52$

\therefore HCF = 4

So, $\frac{12 \div 4}{52 \div 4} = \frac{3}{13}$

Hence, $\frac{12}{52} = \frac{3}{13}$

(e) $\frac{7}{28}$

We have $7 = 1, \textcircled{7}$

$28 = 1, 2, 4, \textcircled{7}, 14, 28$

\therefore HCF = 7

So, $\frac{7 \div 7}{28 \div 7} = \frac{1}{4}$

Hence, $\frac{7}{28} = \frac{1}{4}$

Q8. Ramesh had 28 pencils, Sheelu had 50 pencils and Jamaal had 80 pencils. After 4 months, Ramesh used up 10 pencils, Sheelu used up 25 pencils and Jamaal used up 40 pencils. What fraction did each use up? Check if each has used up an equal fraction of her/his pencils.

Sol. Ramesh used up 10 pencils out of 20 pencils.

\therefore Fraction = $\frac{10}{20} = \frac{1}{2}$

Sheelu used up 25 pencils out of 50 pencils.

\therefore Fraction = $\frac{25}{50} = \frac{25 \div 25}{50 \div 25} = \frac{1}{2}$

Jamaal used up 40 pencils out of 80 pencils.

\therefore Fraction = $\frac{40}{80} = \frac{4}{8} = \frac{1}{2}$

Yes, each has used up an equal fractions, i.e., $\frac{1}{2}$.

Q9. Match the equivalent fractions and write two more for each.

(i) $\frac{250}{400}$ (a) $\frac{2}{3}$

(ii) $\frac{180}{200}$ (b) $\frac{2}{5}$

(iii) $\frac{660}{990}$ (c) $\frac{1}{2}$

(iv) $\frac{180}{360}$ (d) $\frac{5}{8}$

(v) $\frac{220}{550}$ (e) $\frac{9}{10}$

Sol. (i) $\frac{250}{400}$

Factors of 250 = $2 \times 5 \times 5 \times 5$

Factors of 400 = $2 \times \boxed{2 \times 2 \times 2} \times 5 \times 5$

HCF = $2 \times 5 \times 5 = 50$

$\therefore \frac{250 \div 50}{400 \div 50} = \frac{5}{8}$

$$\therefore \frac{250}{400} \leftrightarrow \frac{5}{8} \text{ or (i) } \leftrightarrow \text{(d)}$$

Two additional examples of equivalent fractions are

$$(a) \frac{5}{8} \times \frac{3}{3} = \frac{15}{24} \quad (b) \frac{5}{8} \times \frac{5}{5} = \frac{25}{40}$$

$$(ii) \frac{180}{200}$$

$$\text{Factors of 180} = \boxed{2} \times \boxed{2} \times 3 \times 3 \times \boxed{5}$$

$$\text{Factors of 200} = \boxed{2} \times \boxed{2} \times 2 \times 5 \times \boxed{5}$$

$$\text{HCF} = 2 \times 2 \times 5 = 20$$

$$\therefore \frac{180 \div 20}{200 \div 20} = \frac{9}{10}$$

$$\therefore \frac{180}{200} \leftrightarrow \frac{9}{10} \text{ or (ii) } \leftrightarrow \text{(e)}$$

Two additional examples of equivalent fractions are

$$(a) \frac{9}{10} \times \frac{2}{2} = \frac{18}{20} \quad (b) \frac{9}{10} \times \frac{3}{3} = \frac{27}{30}$$

$$(iii) \frac{660}{990}$$

$$\frac{660 \div 110}{990 \div 110} = \frac{66}{99}$$

$$\text{Factors of 66} = 2 \times \boxed{3} \times 11$$

$$\text{Factors of 99} = 3 \times \boxed{3} \times 11$$

$$\text{HCF} = 3 \times 11 = 33$$

$$\therefore \frac{66 \div 33}{99 \div 33} = \frac{2}{3}$$

$$\text{So, } \frac{660}{990} \leftrightarrow \frac{2}{3} \text{ or (iii) } \leftrightarrow \text{(a)}$$

Two additional examples of equivalent fractions are

$$(a) \frac{2}{3} \times \frac{2}{2} = \frac{4}{6} \quad (b) \frac{2}{3} \times \frac{3}{3} = \frac{6}{9}$$

$$(iv) \frac{180}{360}$$

$$\frac{180 \div 18}{360 \div 18} = \frac{18}{36}$$

$$\text{Factors of 18} = \boxed{2} \times \boxed{3} \times \boxed{3}$$

$$\text{Factors of 36} = \boxed{2} \times 2 \times \boxed{3} \times \boxed{3}$$

$$\text{HCF} = 2 \times 3 \times 3 = 18$$

$$\therefore \frac{18 \div 18}{36 \div 18} = \frac{1}{2}$$

$$\text{So, } \frac{180}{360} \leftrightarrow \frac{1}{2} \text{ or (iv) } \leftrightarrow \text{(c)}$$

Two additional examples of equivalent fractions are

$$(a) \frac{1}{2} \times \frac{3}{3} = \frac{3}{6} \quad (b) \frac{1}{2} \times \frac{5}{5} = \frac{5}{10}$$

$$(v) \frac{220}{550}$$

$$\frac{220 \div 10}{550 \div 10} = \frac{22}{55}$$

$$\text{Factors of 22} = 2 \times \boxed{11}$$

$$\text{Factors of 55} = 5 \times \boxed{11}$$

$$\text{HCF} = 11$$

$$\therefore \frac{22 \div 11}{55 \div 11} = \frac{2}{5}$$

$$\text{So, } \frac{220}{550} \leftrightarrow \frac{2}{5} \text{ or (v) } \leftrightarrow \text{(b)}$$

Two additional examples of equivalent fractions are

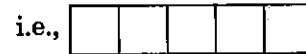
$$(a) \frac{2}{5} \times \frac{2}{2} = \frac{4}{10} \quad (b) \frac{2}{5} \times \frac{3}{3} = \frac{6}{15}$$

TRY THESE (PAGE 148)

Q1. You get one-fifth of a bottle of juice and your sister gets one-third of a bottle of juice. Who gets more?

Sol. Let us divide a rectangle into five equal parts and shade one of them.

A person gets one-fifth, i.e., $\frac{1}{5}$ of a bottle of juice,



For his sister, divide the same rectangle into three equal parts and shade one of them,



We get one-third, i.e., $\frac{1}{3}$ part of the bottle of juice.

So, by comparing the two rectangles, his sister gets more.

TRY THESE (PAGE 149)

Q1. Which is the larger fraction?

$$(i) \frac{7}{10} \text{ or } \frac{8}{10} \quad (ii) \frac{11}{24} \text{ or } \frac{13}{24}$$

$$(iii) \frac{17}{102} \text{ or } \frac{12}{102}$$

Why are these comparisons easy to make?

Sol. (i) $\frac{7}{10}$ or $\frac{8}{10}$

Here, denominators of the two fractions are same and $7 < 8$

$$\therefore \frac{8}{10} \text{ is larger than } \frac{7}{10}$$

(ii) $\frac{11}{24}$ or $\frac{13}{24}$

Here, denominators of the two fractions are same and $11 < 13$

$$\therefore \frac{13}{24} \text{ is larger than } \frac{11}{24}$$

(iii) $\frac{17}{102}$ or $\frac{12}{102}$

Here, denominators of the two fractions are same and $17 > 12$

$$\therefore \frac{17}{102} > \frac{12}{102}$$

These comparisons are easy to make as the denominators of each pair of fractions is same.

Q2. Write these in ascending and also in descending order.

(a) $\frac{1}{8}, \frac{5}{8}, \frac{3}{8}$

(b) $\frac{1}{5}, \frac{11}{5}, \frac{4}{5}, \frac{3}{5}, \frac{7}{5}$

(c) $\frac{1}{7}, \frac{3}{7}, \frac{13}{7}, \frac{11}{7}, \frac{7}{7}$

Sol. (a) Given that: $\frac{1}{8}, \frac{5}{8}, \frac{3}{8}$

Here, the denominators of each fractions is same and 1, 3 and 5 are in ascending order.

$$\therefore \frac{1}{8}, \frac{3}{8}, \frac{5}{8} \text{ are in ascending order.}$$

$$\frac{5}{8}, \frac{3}{8}, \frac{1}{8} \text{ are in descending order.}$$

(b) Given that: $\frac{1}{5}, \frac{11}{5}, \frac{4}{5}, \frac{3}{5}, \frac{7}{5}$

Here, the denominators of each fractions is same and 1, 3, 4, 7 and 11 are in ascending order.

$$\therefore \frac{1}{5}, \frac{3}{5}, \frac{4}{5}, \frac{7}{5}, \frac{11}{5} \text{ are in ascending order.}$$

$$\frac{11}{5}, \frac{7}{5}, \frac{4}{5}, \frac{3}{5}, \frac{1}{5} \text{ are in descending order.}$$

(c) Given that: $\frac{1}{7}, \frac{3}{7}, \frac{13}{7}, \frac{11}{7}, \frac{7}{7}$

Here, the denominators of each fraction is same and 1, 3, 7, 11 and 13 are in ascending order.

$$\therefore \frac{1}{7}, \frac{3}{7}, \frac{7}{7}, \frac{11}{7}, \frac{13}{7} \text{ are in ascending order.}$$

$$\frac{13}{7}, \frac{11}{7}, \frac{7}{7}, \frac{3}{7}, \frac{1}{7} \text{ are in descending order.}$$

TRY THESE (PAGE 151)

Q1. Arrange the following in ascending and descending order:

(a) $\frac{1}{12}, \frac{1}{23}, \frac{1}{5}, \frac{1}{7}, \frac{1}{50}, \frac{1}{9}, \frac{1}{17}$

(b) $\frac{3}{7}, \frac{3}{11}, \frac{3}{5}, \frac{3}{2}, \frac{3}{13}, \frac{3}{4}, \frac{3}{17}$

(c) Write 3 more similar examples and arrange them in ascending and descending order.

Sol. We know that if the numerators of all the fractions are same in unlike fractions, then smaller value of the denominator, the greater the value of the fractions.

(a) Here, numerator of each fractions is 1.

5, 7, 9, 12, 17, 23 and 50 are in ascending order.

$\therefore \frac{1}{50}, \frac{1}{23}, \frac{1}{17}, \frac{1}{12}, \frac{1}{9}, \frac{1}{7}$ and $\frac{1}{5}$ are in ascending order.

$\frac{1}{5}, \frac{1}{7}, \frac{1}{9}, \frac{1}{12}, \frac{1}{17}, \frac{1}{23}$ and $\frac{1}{50}$ are in descending order.

(b) Here, numerator of each fraction is 3.
2, 4, 5, 7, 11, 13 and 17 are in ascending order.

$\therefore \frac{3}{17}, \frac{3}{13}, \frac{3}{11}, \frac{3}{7}, \frac{3}{5}, \frac{3}{4}$ and $\frac{3}{2}$ are in ascending order.

$\frac{3}{2}, \frac{3}{4}, \frac{3}{5}, \frac{3}{7}, \frac{3}{11}, \frac{3}{13}$ and $\frac{3}{17}$ are in descending order.

(c) Three additional examples of unlike fractions with same numerators are;

(i) $\frac{2}{7}, \frac{2}{5}, \frac{2}{13}, \frac{2}{11}, \frac{2}{15}, \frac{2}{3}$

Ascending order is $\frac{2}{15}, \frac{2}{13}, \frac{2}{11}, \frac{2}{7}, \frac{2}{5}$ and $\frac{2}{3}$

and descending order is

$$\frac{2}{3}, \frac{2}{5}, \frac{2}{7}, \frac{2}{11}, \frac{2}{13} \text{ and } \frac{2}{15}$$

(ii) $\frac{5}{8}, \frac{5}{12}, \frac{5}{6}, \frac{5}{13}, \frac{5}{17}$

Ascending order is $\frac{5}{17}, \frac{5}{13}, \frac{5}{12}, \frac{5}{8}$ and $\frac{5}{6}$

Descending order is $\frac{5}{6}, \frac{5}{8}, \frac{5}{12}, \frac{5}{13}$ and $\frac{5}{17}$

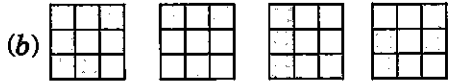
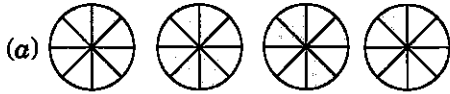
(iii) $\frac{7}{11}, \frac{7}{9}, \frac{7}{17}, \frac{7}{26}, \frac{7}{20}$

Ascending order is $\frac{7}{26}, \frac{7}{20}, \frac{7}{17}, \frac{7}{11}$ and $\frac{7}{9}$

Descending order is $\frac{7}{9}, \frac{7}{11}, \frac{7}{17}, \frac{7}{20}$ and $\frac{7}{26}$

EXERCISE 7.4

Q1. Write shaded portion as fraction. Arrange them in ascending and descending order using correct sign '<', '=', '>' between the fractions.



(c) Show $\frac{2}{6}$, $\frac{4}{6}$, $\frac{8}{6}$ and $\frac{6}{6}$ on the number line.

Put appropriate signs between the fractions given.

$$\frac{5}{6} \square \frac{2}{6}, \frac{3}{6} \square 0, \frac{1}{6} \square \frac{6}{6}, \frac{8}{6} \square \frac{5}{6}$$

Sol. (a) Total number of divisions = 8

(i) Number of shaded parts = 3

$$\therefore \text{Fraction} = \frac{3}{8}$$

(ii) Total number of divisions = 8

Number of shaded parts = 6

$$\therefore \text{Fraction} = \frac{6}{8}$$

(iii) Total number of divisions = 8

Number of shaded parts = 4

$$\therefore \text{Fraction} = \frac{4}{8}$$

(iv) Total number of divisions = 8

Number of shaded part = 1

$$\therefore \text{Fraction} = \frac{1}{8}$$

Now the fractions are:

$\frac{3}{8}, \frac{6}{8}, \frac{4}{8}$ and $\frac{1}{8}$ with same denominator.

Ascending order: $\frac{1}{8} < \frac{3}{8} < \frac{4}{8} < \frac{6}{8}$

Descending order $\frac{6}{8} > \frac{4}{8} > \frac{3}{8} > \frac{1}{8}$

(b)(i) Total number of divisions = 9

Number of shaded parts = 8

$$\therefore \text{Fraction} = \frac{8}{9}$$

(ii) Total number of divisions = 9

Number of shaded parts = 4

$$\therefore \text{Fraction} = \frac{4}{9}$$

(iii) Total number of divisions = 9

Number of shaded parts = 3

$$\therefore \text{Fraction} = \frac{3}{9}$$

(iv) Total number of divisions = 9

Number of shaded parts = 6

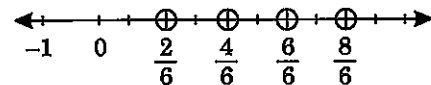
$$\therefore \text{Fractions} = \frac{6}{9}$$

\therefore Fractions are $\frac{8}{9}, \frac{4}{9}, \frac{3}{9}, \frac{6}{9}$ with same denominator.

Ascending order: $\frac{3}{9} < \frac{4}{9} < \frac{6}{9} < \frac{8}{9}$

Descending order $\frac{8}{9} > \frac{6}{9} > \frac{4}{9} > \frac{3}{9}$

(c) $\frac{2}{6}, \frac{4}{6}, \frac{8}{6}$ and $\frac{6}{6}$



Now $\frac{5}{6} \square \frac{2}{6}, \frac{3}{6} \square 0, \frac{1}{6} \square \frac{6}{6}, \frac{8}{6} \square \frac{5}{6}$

Q2. Compare the fractions and put an appropriate sign.

(a) $\frac{3}{6} \square \frac{5}{6}$

(b) $\frac{1}{7} \square \frac{1}{4}$

(c) $\frac{4}{5} \square \frac{5}{5}$

(d) $\frac{3}{5} \square \frac{3}{7}$

Sol. (a) $\frac{3}{6} \square \frac{5}{6}$

Here, denominators of the two fractions are same and $3 < 5$.

$$\therefore \frac{3}{6} \square \frac{5}{6}$$

(b) $\frac{1}{7} \square \frac{1}{4}$

Here, numerators of the fractions are same and $7 > 4$.

$$\therefore \frac{1}{7} \square \frac{1}{4}$$

(c) $\frac{4}{5} \square \frac{5}{5}$

Here, denominators of the two fractions are same and $4 < 5$.

$$\therefore \frac{4}{5} \square \frac{5}{5}$$

(d) $\frac{3}{5} \square \frac{3}{7}$

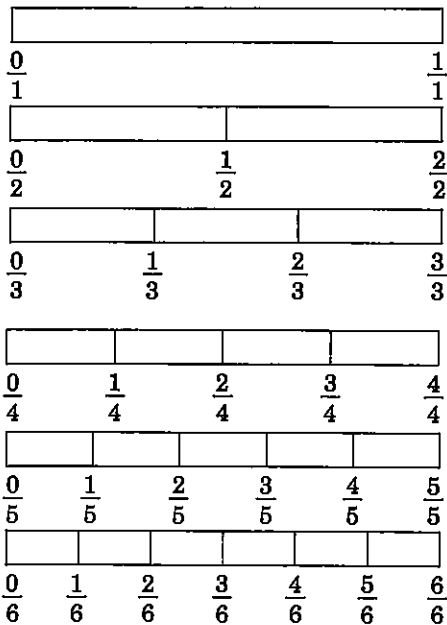
Here, numerators of the two fractions are same and $5 < 7$.

$$\therefore \frac{3}{5} \square \frac{3}{7}$$

Q3. Make five more such pairs and put appropriate signs.

Sol. (a) $\frac{2}{7} > \frac{2}{11}$ (b) $\frac{6}{8} > \frac{3}{8}$
 (c) $\frac{4}{9} > \frac{3}{9}$ (d) $\frac{1}{9} < \frac{5}{9}$
 (e) $\frac{4}{10} < \frac{6}{10}$

Q4. Look at the figures and write '<', or '>', '=' between the given pairs of fractions.



(a) $\frac{1}{6} < \frac{1}{3}$ (b) $\frac{3}{4} > \frac{2}{6}$
 (c) $\frac{2}{3} > \frac{2}{4}$ (d) $\frac{6}{6} = \frac{3}{3}$
 (e) $\frac{5}{6} < \frac{5}{5}$

Make five more such problems and solve them with your friends

Sol. (a) $\frac{1}{6} < \frac{1}{3}$ (b) $\frac{3}{4} > \frac{2}{6}$
 (c) $\frac{2}{3} > \frac{2}{4}$ (d) $\frac{6}{6} = \frac{3}{3}$
 (e) $\frac{5}{6} < \frac{5}{5}$

Make five more such problems yourself and solve them with your friends.

Q5. How quickly can you do this? Fill appropriate sign. ('<', '=', '>').

(a) $\frac{1}{2} < \frac{1}{5}$ (b) $\frac{2}{4} < \frac{3}{6}$ (c) $\frac{3}{5} < \frac{2}{3}$

(d) $\frac{3}{4} < \frac{2}{8}$ (e) $\frac{3}{5} < \frac{6}{5}$ (f) $\frac{7}{9} < \frac{3}{9}$
 (g) $\frac{1}{4} < \frac{2}{8}$ (h) $\frac{6}{10} < \frac{4}{5}$ (i) $\frac{3}{4} < \frac{7}{8}$
 (j) $\frac{5}{7} < \frac{15}{21}$

Sol. (a) $\frac{1}{2} < \frac{1}{5}$

We have $1 \times 5 = 5$ and $1 \times 2 = 2$

Here, $2 < 5 \therefore \frac{1}{2} > \frac{1}{5}$

(b) $\frac{2}{4} < \frac{3}{6}$

We have $2 \times 6 = 12$ and $3 \times 4 = 12$

Here, $12 = 12 \therefore \frac{2}{4} = \frac{3}{6}$

(c) $\frac{3}{5} < \frac{2}{3}$

We have $3 \times 3 = 9$ and $2 \times 5 = 10$

Here, $9 < 10 \therefore \frac{3}{5} < \frac{2}{3}$

(d) $\frac{3}{4} < \frac{2}{8}$

We have $3 \times 8 = 24$ and $2 \times 4 = 8$

Here, $24 < 8 \therefore \frac{3}{4} > \frac{2}{8}$

(e) $\frac{3}{5} < \frac{6}{5}$

We have $3 \times 5 = 15$ and $6 \times 5 = 30$

Here, $15 < 30 \therefore \frac{3}{5} < \frac{6}{5}$

(f) $\frac{7}{9} < \frac{3}{9}$

We have $7 \times 9 = 63$ and $3 \times 9 = 27$

Here, $63 < 27 \therefore \frac{7}{9} > \frac{3}{9}$

(g) $\frac{1}{4} < \frac{2}{8}$

We have $1 \times 8 = 8$ and $2 \times 4 = 8$

Here, $8 < 8 \therefore \frac{1}{4} = \frac{2}{8}$

(h) $\frac{6}{10} < \frac{4}{5}$

We have $6 \times 5 = 30$ and $10 \times 4 = 40$

Here, $30 < 40 \therefore \frac{6}{10} < \frac{4}{5}$

$$(i) \frac{3}{4} \square \frac{7}{8}$$

We have $3 \times 8 = 24$ and $4 \times 7 = 28$

$$\text{Here, } 24 < 28 \quad \therefore \frac{3}{4} \square < \frac{7}{8}$$

$$(j) \frac{5}{7} \square \frac{15}{21}$$

We have $5 \times 21 = 105$ and $7 \times 15 = 105$

$$\text{Here, } 105 < 105 \quad \therefore \frac{5}{7} = \frac{15}{21}$$

Q6. The following fractions represent just three different numbers. Separate them into three groups of equivalent fractions, by changing each one to its simplest form.

$$(a) \frac{2}{12} \quad (b) \frac{3}{15} \quad (c) \frac{8}{50} \quad (d) \frac{16}{100}$$

$$(e) \frac{10}{60} \quad (f) \frac{15}{75} \quad (g) \frac{12}{60} \quad (h) \frac{16}{96}$$

$$(i) \frac{12}{75} \quad (j) \frac{12}{72} \quad (k) \frac{3}{18} \quad (l) \frac{4}{25}$$

$$\text{Sol. (a) } \frac{2}{12} = \frac{2 \div 2}{12 \div 2} = \frac{1}{6} \quad [\because \text{HCF of 2 and 12 is 2}]$$

$$(b) \frac{3}{15} = \frac{3 \div 3}{15 \div 3} = \frac{1}{5} \quad [\because \text{HCF of 3 and 15 is 3}]$$

$$(c) \frac{8}{50} = \frac{8 \div 2}{50 \div 2} = \frac{4}{25} \quad [\because \text{HCF of 8 and 50 is 2}]$$

$$(d) \frac{16}{100} = \frac{16 \div 4}{100 \div 4} = \frac{4}{25} \quad [\because \text{HCF of 16 and 100 is 4}]$$

$$(e) \frac{10}{60} = \frac{10 \div 10}{60 \div 10} = \frac{1}{6} \quad [\because \text{HCF of 10 and 60 is 10}]$$

$$(f) \frac{15}{75} = \frac{15 \div 15}{75 \div 15} = \frac{1}{5} \quad [\because \text{HCF of 15 and 75 is 15}]$$

$$(g) \frac{12}{60} = \frac{12 \div 12}{60 \div 12} = \frac{1}{5} \quad [\because \text{HCF of 12 and 60 is 12}]$$

$$(h) \frac{16}{96} = \frac{16 \div 16}{96 \div 16} = \frac{1}{6} \quad [\because \text{HCF of 16 and 96 is 16}]$$

$$(i) \frac{12}{75} = \frac{12 \div 3}{75 \div 3} = \frac{4}{25} \quad [\because \text{HCF of 12 and 75 is 3}]$$

$$(j) \frac{12}{72} = \frac{12 \div 12}{72 \div 12} = \frac{1}{6} \quad [\because \text{HCF of 12 and 72 is 12}]$$

$$(k) \frac{3}{18} = \frac{3 \div 3}{18 \div 3} = \frac{1}{6} \quad [\because \text{HCF of 3 and 18 is 3}]$$

$$(l) \frac{4}{25} = \frac{4 \div 1}{25 \div 1} = \frac{4}{25} \quad [\because \text{HCF of 4 and 25 is 1}]$$

Now grouping the above fractions into equivalent fractions, we have

$$(i) \frac{2}{12} = \frac{10}{60} = \frac{16}{96} = \frac{12}{72} = \frac{3}{18} \quad \left[\text{each } \frac{1}{6} \right]$$

$$(ii) \frac{3}{15} = \frac{15}{75} = \frac{12}{60} \quad \left[\text{each } \frac{1}{5} \right]$$

$$(iii) \frac{8}{50} = \frac{16}{100} = \frac{12}{75} = \frac{4}{25} \quad \left[\text{each } \frac{4}{25} \right]$$

Q7. Find answers to the following. Write and indicate how you solved them.

$$(a) \text{ Is } \frac{5}{9} \text{ equal to } \frac{4}{5}?$$

$$(b) \text{ Is } \frac{9}{16} \text{ equal to } \frac{5}{9}?$$

$$(c) \text{ Is } \frac{4}{5} \text{ equal to } \frac{16}{20}?$$

$$(d) \text{ Is } \frac{1}{15} \text{ equal to } \frac{4}{30}?$$

$$\text{Sol. (a) } \frac{5}{9} \text{ and } \frac{4}{5}$$

By cross-multiplying, we get

$$5 \times 5 = 25 \text{ and } 4 \times 9 = 36$$

$$\text{Since } 25 \neq 36$$

$$\therefore \frac{5}{9} \text{ is not equal to } \frac{4}{5}.$$

$$(b) \frac{9}{16} \text{ and } \frac{5}{9}$$

By cross-multiplying, we get

$$9 \times 9 = 81 \text{ and } 16 \times 5 = 80$$

$$\text{Since } 81 \neq 80$$

$$\therefore \frac{9}{16} \text{ is not equal to } \frac{5}{9}.$$

$$(c) \frac{4}{5} \text{ and } \frac{16}{20}$$

By cross-multiplying, we get

$$4 \times 20 = 80 \text{ and } 5 \times 16 = 80$$

$$\text{Since } 80 = 80$$

$$\therefore \frac{4}{5} \text{ is equal to } \frac{16}{20}.$$

$$(d) \frac{1}{15} \text{ and } \frac{4}{30}$$

By cross-multiplying, we get

$$1 \times 30 = 30 \text{ and } 4 \times 15 = 60$$

$$\text{Since } 30 \neq 60$$

$$\therefore \frac{1}{15} \text{ is not equal to } \frac{4}{30}.$$

Q8. Ila read 25 pages of a book containing 100 pages.

Lalita read $\frac{2}{5}$ of the same book. Who read less?

Sol. Ila reads 25 pages out of 100 pages.

$$\therefore \text{Fractions} = \frac{25}{100} = \frac{25 \div 25}{100 \div 25} = \frac{1}{4}$$

Lalita reads $\frac{2}{5}$ of the same book.

Comparing $\frac{1}{4}$ and $\frac{2}{5}$, we get

$$1 \times 5 = 5 \text{ and } 2 \times 4 = 8$$

$$\text{Since } 5 < 8 \quad \therefore \frac{1}{4} < \frac{2}{5}$$

Hence Ila reads less pages.

Q9. Rafiq exercised for $\frac{3}{6}$ of an hour, while Rohit

exercised for $\frac{3}{4}$ of an hour. Who exercised for a longer time?

Sol. Rafiq exercised for $\frac{3}{6}$ of an hour.

Rohit exercised for $\frac{3}{4}$ of an hour.

Comparing $\frac{3}{6}$ and $\frac{3}{4}$, we get

$$3 \times 4 = 12 \text{ and } 3 \times 6 = 18$$

$$\text{Since } 12 < 18 \quad \therefore \frac{3}{4} > \frac{3}{6}$$

Hence Rohit exercised for longer time.

Q10. In a class A of 25 students, 20 passed in first class, in another class B of 30 students, 24 passed in first class. In which class was a greater fraction of students getting first class?

Sol. In class A, 20 students passed in first class out of 25 students.

\therefore Fraction of students getting first class

$$= \frac{20}{25} = \frac{20 \div 5}{25 \div 5} = \frac{4}{5}$$

In class B, 24 students passed in first class out of 30 students.

\therefore Fraction of students getting first class

$$= \frac{24}{30} = \frac{24 \div 6}{30 \div 6} = \frac{4}{5}$$

Comparing the two fractions, we get $\frac{4}{5} = \frac{4}{5}$

Hence, both the class A and B have the same fractions.

TRY THESE (PAGE 155)

Q1. My mother divided an apple into 4 equal parts. She gave me two parts and my brother one part. How much apple did she give to both of us together?

Sol. Apple was divided in 4 equal parts.

I got 2 parts.

$$\therefore \text{Fraction} = \frac{2}{4}$$

My brother got 1 part.

$$\therefore \text{Fraction} = \frac{1}{4}$$

\therefore Fractions got by both together

$$= \frac{2}{4} + \frac{1}{4} = \frac{2+1}{4} = \frac{3}{4}$$

Hence, both of us got $\frac{3}{4}$ of the apple.

Q2. Mother asked Neelu and her brother to pick stones from the wheat. Neelu picked one fourth of the total stones in it and her brother also picked up one fourth of the stones. What fraction of the stones did both pick up together?

Sol. Neelu picked up $\frac{1}{4}$ th of the stones.

Her brother picked up $\frac{1}{4}$ th of the stones.

\therefore Fractions of stones picked up by both

$$= \frac{1}{4} + \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$$

Hence, the stones picked up by both = $\frac{1}{2}$ of the stones.

Q3. Sohan was putting covers on his notebooks. He put one fourth of the covers on Monday. He put another one fourth on Tuesday and the remaining on Wednesday. What fraction of the covers did he put on Wednesday?

Sol. Sohan put $\frac{1}{4}$ th of the covers on Monday.

He put $\frac{1}{4}$ th of the covers on Tuesday.

He put the remaining covers on Wednesday.

$$\text{Remaining covers} = 1 - \left(\frac{1}{4} + \frac{1}{4} \right)$$

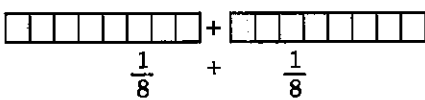
$$= 1 - \frac{2}{4} = \frac{2}{4} = \frac{1}{2}$$

Hence on Wednesday, he put $\frac{1}{2}$ of the covers.


TRY THESE (PAGE 156)

Q1. Add with the help of a diagram.

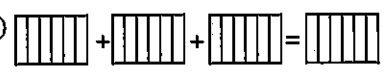
(i) $\frac{1}{8} + \frac{1}{8}$ (ii) $\frac{2}{5} + \frac{3}{5}$ (iii) $\frac{1}{6} + \frac{1}{6} + \frac{1}{6}$

Sol. (i) 

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

(ii) 

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

(iii) 

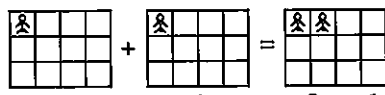
$$\frac{1}{6} + \frac{1}{6} + \frac{1}{6} = \frac{3}{6} = \frac{1}{2}$$

Q2. Add $\frac{1}{12} + \frac{1}{12}$. How will we show this pictorially?

Using paper folding.

Sol.
$$\frac{1}{12} + \frac{1}{12} = \frac{1+1}{12} = \frac{2}{12} = \frac{1}{6}$$

To show $\frac{1}{12} + \frac{1}{12}$ by pictograph, we get



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

Using paper folding is an activity.

Students will do it themselves.

Q3. Make 5 more examples of problems given in 1 and 2 above. Solve them with your friends.

Sol. Example 1: Add with the help of diagram

(a) $\frac{1}{5} + \frac{2}{5} + \frac{3}{5}$ (b) $\frac{1}{7} + \frac{2}{7}$

Example 2: Add with the help of diagram

(a) $\frac{1}{4} + \frac{3}{4}$ (b) $\frac{5}{6} + \frac{1}{6}$

Example 3: Add $\frac{1}{8} + \frac{1}{8}$. How will you show this pictorially? Using paper folding.

Example 4: Add $\frac{3}{6} + \frac{2}{6}$. How will you show this pictorially? Using paper folding.

Example 5: Add $\frac{3}{8} + \frac{2}{8}$ with the help of diagram solve the above examples with your friends.

TRY THESE (PAGE 157)

Q1. Find the difference between $\frac{7}{8}$ and $\frac{3}{8}$.

Sol. Here, $\frac{7}{8} > \frac{3}{8}$

$$\therefore \frac{7}{8} - \frac{3}{8} = \frac{7-3}{8} = \frac{4}{8} = \frac{1}{2}$$

Thus, the difference between $\frac{7}{8}$ and $\frac{3}{8} = \frac{1}{2}$.

Q2. Mother made a gud patti in a round shape. She divided it into 5 parts. Seema ate one piece from it. If I eat another piece then how much would be left?

Sol. Total number of equal parts of gud patti = 5

Number of parts eaten by Seema = 1

$$\therefore \text{Fraction of eaten part} = \frac{1}{5}$$

Number of parts eaten by me = 1

$$\therefore \text{Fraction of eaten part} = \frac{1}{5}$$

\therefore Fraction of gud patti eaten by

$$\text{Seema and me} = \frac{1}{5} + \frac{1}{5} = \frac{1+1}{5} = \frac{2}{5}$$

\therefore Fraction of gud patti left

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

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

Hence, the left fraction = $\frac{3}{5}$.

Q3. My elder sister divided the watermelon into 16 parts. I ate 7 out of them. My friend ate 4. How much did we eat between us? How much more of the watermelon did I eat than my friend? What portion of the watermelon remained?

Sol. Total number of parts of watermelon = 16

Number of parts eaten by me = 7

$$\therefore \text{Fraction of watermelon eaten by me} = \frac{7}{16}$$

Number of parts eaten by my friend = 4

$$\therefore \text{Fraction of watermelon eaten by my friend} = \frac{4}{16}$$

Fraction of watermelon eaten by me and my friend

$$= \frac{7}{16} + \frac{4}{16} = \frac{7+4}{16} = \frac{11}{16}$$

$$\therefore \text{Fraction of watermelon eaten by both of us} = \frac{11}{16}$$

Fraction of watermelon eaten by me
– Fraction of watermelon eaten by my friend

$$= \frac{7}{16} - \frac{4}{16} = \frac{7-4}{16} = \frac{3}{16}$$

So, I ate $\frac{3}{16}$ part more than my friend.

Portion of watermelon left now

$$= 1 - \frac{11}{16} = \frac{1}{1} - \frac{11}{16} = \frac{1 \times 16 - 1 \times 11}{16}$$

$$= \frac{16-11}{16} = \frac{5}{16}$$

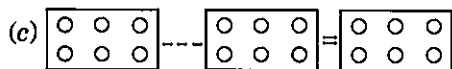
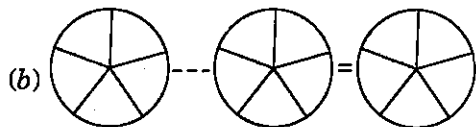
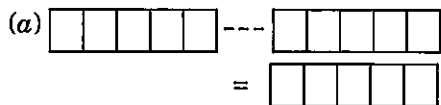
Hence, the left part of the watermelon = $\frac{5}{16}$.

Q4. Make five problems of this type and solve them with your friends.

Sol. Try yourself with the help of Q. No. 2.

EXERCISE 7.5

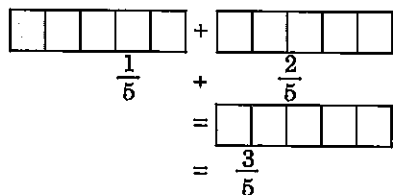
Q1. Write these fractions appropriately as additions or subtractions.



Sol. (a) The given figure represents the addition of $\frac{1}{5}$ and $\frac{2}{5}$.

$$\text{i.e., } \frac{1}{5} + \frac{2}{5} = \frac{1+2}{5} = \frac{3}{5}$$

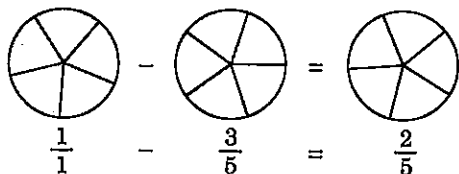
Thus the given diagrams can be represented as



(b) The given figure represents the difference between 1 and $\frac{3}{5}$.

$$\text{i.e., } 1 - \frac{3}{5} = \frac{1}{1} - \frac{3}{5} = \frac{1 \times 5 - 3 \times 1}{5} = \frac{5-3}{5} = \frac{2}{5}$$

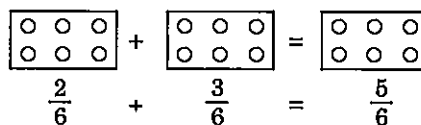
Thus, the given diagrams can be represented as



(c) The given figure represents addition of $\frac{2}{6}$ and $\frac{3}{6}$.

$$\text{i.e., } \frac{2}{6} + \frac{3}{6} = \frac{2+3}{6} = \frac{5}{6}$$

Thus, the given diagrams can be represented as



Q2. Solve:

(a) $\frac{1}{18} + \frac{1}{18}$

(b) $\frac{8}{15} + \frac{3}{15}$

(c) $\frac{7}{7} - \frac{5}{7}$

(d) $\frac{1}{22} + \frac{21}{22}$

(e) $\frac{12}{15} - \frac{7}{15}$

(f) $\frac{5}{8} + \frac{3}{8}$

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

(h) $\frac{1}{4} + \frac{0}{4}$

(i) $3 - \frac{12}{5}$

Sol. (a) $\frac{1}{18} + \frac{1}{18} = \frac{1+1}{18} = \frac{2}{18} = \frac{2 \div 2}{18 \div 2} = \frac{1}{9}$

(b) $\frac{8}{15} + \frac{3}{15} = \frac{8+3}{15} = \frac{11}{15}$

(c) $\frac{7}{7} - \frac{5}{7} = \frac{7-5}{7} = \frac{2}{7}$

(d) $\frac{1}{22} + \frac{21}{22} = \frac{1+21}{22} = \frac{22}{22} = 1$

(e) $\frac{12}{15} - \frac{7}{15} = \frac{12-7}{15} = \frac{5}{15} = \frac{5 \div 5}{15 \div 5} = \frac{1}{3}$

(f) $\frac{5}{8} + \frac{3}{8} = \frac{5+3}{8} = \frac{8}{8} = 1$

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

(h) $\frac{1}{4} + \frac{0}{4} = \frac{1+0}{4} = \frac{1}{4}$

(i) $3 - \frac{12}{5} = \frac{3}{1} - \frac{12}{5} = \frac{3 \times 5 - 12 \times 1}{5} = \frac{15-12}{5} = \frac{3}{5}$

Q3. Shubham painted $\frac{2}{3}$ of the wall space in his room. His sister Madhavi helped and painted $\frac{1}{3}$ of the wall space. How much did they paint together?

Sol. Fraction of wall painted by Shubham = $\frac{2}{3}$
 Fraction of wall painted by Madhavi = $\frac{1}{3}$
 Fraction of wall painted by Shubham and Madhavi = $\frac{2}{3} + \frac{1}{3} = \frac{2+1}{3} = \frac{3}{3} = 1$
 Thus the fraction of wall painted by both = 1

Q4. Fill in the missing fractions.

(a) $\frac{7}{10} - \square = \frac{3}{10}$ (b) $\square - \frac{3}{21} = \frac{5}{21}$

(c) $\square - \frac{3}{6} = \frac{3}{6}$ (d) $\square + \frac{5}{27} = \frac{12}{27}$

Sol. (a) The difference between $\frac{7}{10}$ and \square is $\frac{3}{10}$.

∴ Missing fraction

$$= \frac{7}{10} - \frac{3}{10} = \frac{7-3}{10} = \frac{4}{10} = \frac{4 \div 2}{10 \div 2} = \frac{2}{5}$$

Thus, $\square = \frac{2}{5}$

(b) The difference between \square and $\frac{3}{21}$ is $\frac{5}{21}$.

∴ Missing fraction = $\frac{5}{21} + \frac{3}{21} = \frac{5+3}{21} = \frac{8}{21}$

Thus, $\square = \frac{8}{21}$

(c) The difference between \square and $\frac{3}{6}$ is $\frac{3}{6}$.

∴ Missing fraction = $\frac{3}{6} + \frac{3}{6} = \frac{3+3}{6} = \frac{6}{6} = 1$

Thus, $\square = 1$

(d) Sum of \square and $\frac{5}{27}$ is $\frac{12}{27}$.

$$\therefore \text{Missing fraction} = \frac{12}{27} - \frac{5}{27} = \frac{12-5}{27} = \frac{7}{27}$$

Thus, $\square = \frac{7}{27}$

Q5. Javed was given $\frac{5}{7}$ of a basket of oranges. What fraction of oranges was left in the basket?

Sol. Fraction of basket of oranges = $\frac{5}{7}$
 Fraction of basket as a whole can be taken as 1.
 ∴ Fraction of basket of oranges left

$$= 1 - \frac{5}{7} = \frac{1}{1} - \frac{5}{7} = \frac{1 \times 7 - 1 \times 5}{7}$$

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

Thus, the required fraction = $\frac{2}{7}$.

TRY THESE (PAGE 159)

Q1. Add $\frac{2}{5}$ and $\frac{3}{7}$.

Sol. We have $\frac{2}{5} + \frac{3}{7}$

LCM of 5 and 7 is 35

$$\text{Therefore, } \frac{2 \times 7}{5 \times 7} + \frac{3 \times 5}{7 \times 5} = \frac{14}{35} + \frac{15}{35} \\ = \frac{14+15}{35} = \frac{29}{35}$$

Hence, $\frac{2}{5} + \frac{3}{7} = \frac{29}{35}$

Q2. Subtract $\frac{2}{5}$ from $\frac{5}{7}$.

Sol. We have $\frac{5}{7} - \frac{2}{5}$

LCM of 7 and 5 = 35

$$\text{Therefore, } \frac{5 \times 5}{7 \times 5} - \frac{2 \times 7}{5 \times 7} = \frac{25}{35} - \frac{14}{35} = \frac{11}{35}$$

Hence, $\frac{5}{7} - \frac{2}{5} = \frac{11}{35}$.

EXERCISE 7.6

Q1. Solve

(a) $\frac{2}{3} + \frac{1}{7}$

(b) $\frac{3}{10} + \frac{7}{15}$

(c) $\frac{4}{9} + \frac{2}{7}$

(d) $\frac{5}{7} + \frac{1}{3}$

(e) $\frac{2}{5} + \frac{1}{6}$

(f) $\frac{4}{5} + \frac{2}{3}$

(g) $\frac{3}{4} - \frac{1}{3}$

(h) $\frac{5}{6} - \frac{1}{3}$

(i) $\frac{2}{3} + \frac{3}{4} + \frac{1}{2}$

(j) $\frac{1}{2} + \frac{1}{3} + \frac{1}{6}$ (k) $1\frac{1}{3} + 3\frac{2}{3}$ (l) $4\frac{2}{3} + 3\frac{1}{4}$

(m) $\frac{16}{5} - \frac{7}{5}$ (n) $\frac{4}{3} - \frac{1}{2}$

Sol. (a) $\frac{2}{3} + \frac{1}{7} = \frac{2 \times 7 + 1 \times 3}{21} = \frac{14+3}{21} = \frac{17}{21}$

Hence, $\frac{2}{3} + \frac{1}{7} = \frac{17}{21}$

$$(b) \frac{3}{10} + \frac{7}{15}$$

LCM of 10 and 15 = 30

$$\therefore \frac{3}{10} + \frac{7}{15} = \frac{3 \times 3}{10 \times 3} + \frac{7 \times 2}{15 \times 2} = \frac{9}{30} + \frac{14}{30} = \frac{23}{30}$$

$$\text{Hence, } \frac{3}{10} + \frac{7}{15} = \frac{23}{30}$$

$$(c) \frac{4}{9} + \frac{2}{7} = \frac{4 \times 7}{9 \times 7} + \frac{2 \times 9}{7 \times 9}$$

$$= \frac{28}{63} + \frac{18}{63} = \frac{28+18}{63} = \frac{46}{63}$$

$$\text{Hence, } \frac{4}{9} + \frac{2}{7} = \frac{46}{63}$$

$$(d) \frac{5}{7} + \frac{1}{3} = \frac{5 \times 3}{7 \times 3} + \frac{1 \times 7}{3 \times 7} = \frac{15}{21} + \frac{7}{21} = \frac{15+7}{21} = \frac{22}{21}$$

$$\text{Hence, } \frac{5}{7} + \frac{1}{3} = \frac{22}{21}$$

$$(e) \frac{2}{5} + \frac{1}{6} = \frac{2 \times 6}{5 \times 6} + \frac{1 \times 5}{6 \times 5}$$

$$= \frac{12}{30} + \frac{5}{30} = \frac{12+5}{30} = \frac{17}{30}$$

$$\text{Hence, } \frac{2}{5} + \frac{1}{6} = \frac{17}{30}$$

$$(f) \frac{4}{5} + \frac{2}{3} = \frac{4 \times 3}{5 \times 3} + \frac{2 \times 5}{3 \times 5}$$

$$= \frac{12}{15} + \frac{10}{15} = \frac{12+10}{15} = \frac{22}{15}$$

$$\text{Hence, } \frac{4}{5} + \frac{2}{3} = \frac{22}{15}$$

$$(g) \frac{3}{4} - \frac{1}{3} = \frac{3 \times 3}{4 \times 3} - \frac{1 \times 4}{3 \times 4} = \frac{9}{12} - \frac{4}{12} = \frac{9-4}{12} = \frac{5}{12}$$

$$\text{Hence, } \frac{3}{4} - \frac{1}{3} = \frac{5}{12}$$

$$(h) \frac{5}{6} - \frac{1}{3}$$

LCM of 6 and 3 = 6

$$\therefore \frac{5}{6} - \frac{1}{3} = \frac{5 \times 1}{6 \times 1} - \frac{1 \times 2}{3 \times 2}$$

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

$$\text{Hence, } \frac{5}{6} - \frac{1}{3} = \frac{1}{2}$$

$$(i) \frac{2}{3} + \frac{3}{4} + \frac{1}{2}$$

LCM of 3, 4 and 2 = 12

$$\therefore \frac{2}{3} + \frac{3}{4} + \frac{1}{2} = \frac{2 \times 4}{3 \times 4} + \frac{3 \times 3}{4 \times 3} + \frac{1 \times 6}{2 \times 6}$$

$$= \frac{8}{12} + \frac{9}{12} + \frac{6}{12} = \frac{8+9+6}{12} = \frac{23}{12}$$

$$\text{Hence, } \frac{2}{3} + \frac{3}{4} + \frac{1}{2} = \frac{23}{12}$$

$$(j) \frac{1}{2} + \frac{1}{3} + \frac{1}{6}$$

LCM of 2, 3 and 6 = 6

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

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

$$\text{Hence, } \frac{1}{2} + \frac{1}{3} + \frac{1}{6} = 1$$

$$(k) 1\frac{1}{3} + 3\frac{2}{3} = 1 + \frac{1}{3} + 3 + \frac{2}{3} = 4 + \frac{1}{3} + \frac{2}{3}$$

$$= 4 + \frac{1+2}{3} = 4 + \frac{3}{3} = 4 + 1 = 5$$

$$\text{Hence, } 1\frac{1}{3} + 3\frac{2}{3} = 5$$

$$(l) 4\frac{2}{3} + 3\frac{1}{4} = 4 + \frac{2}{3} + 3 + \frac{1}{4} = 4 + 3 + \frac{2}{3} + \frac{1}{4}$$

$$= 7 + \frac{2 \times 4}{3 \times 4} + \frac{1 \times 3}{4 \times 3} = 7 + \frac{8}{12} + \frac{3}{12}$$

$$= 7 + \frac{8+3}{12} = 7 + \frac{11}{12} = 7 + \frac{11}{12}$$

$$= \frac{7 \times 12 + 1 \times 11}{12} = \frac{84 + 11}{12} = \frac{95}{12}$$

$$\text{Hence, } 4\frac{2}{3} + 3\frac{1}{4} = \frac{95}{12}$$

$$(m) \frac{16}{5} - \frac{7}{5} = \frac{16-7}{5} = \frac{9}{5}$$

$$\text{Hence, } \frac{16}{5} - \frac{7}{5} = \frac{9}{5}$$

$$(n) \frac{4}{3} - \frac{1}{2} = \frac{4 \times 2}{3 \times 2} - \frac{1 \times 3}{2 \times 3} = \frac{8}{6} - \frac{3}{6} = \frac{8-3}{6} = \frac{5}{6}$$

$$\text{Hence, } \frac{4}{3} - \frac{1}{2} = \frac{5}{6}$$

Q2. Sarita bought $\frac{2}{5}$ metre of ribbon and Lalita $\frac{3}{4}$ metre of ribbon. What is the total length of the ribbon they bought?

Sol. Length of ribbon bought by Sarita = $\frac{2}{5}$ metre

Length of ribbon bought by Lalita = $\frac{3}{4}$ metre

∴ Length of ribbon bought by Sarita and Lalita

$$= \frac{2}{5} \text{ metre} + \frac{3}{4} \text{ metre} = \left(\frac{2}{5} + \frac{3}{4} \right) \text{ metre}$$

$$= \left(\frac{2 \times 4}{5 \times 4} + \frac{3 \times 5}{4 \times 5} \right) \text{ metre} = \left(\frac{8}{20} + \frac{15}{20} \right) \text{ metre}$$

$$= \left(\frac{8+15}{20} \right) \text{ metre} = \frac{23}{20} \text{ metre}$$

Hence, the required length = $\frac{23}{20}$ metre

Q3. Naina was given $1\frac{1}{2}$ piece of cake and Najma was given $1\frac{1}{3}$ piece of cake. Find the total amount of cake was given to both of them.

Sol. Piece of cake given to Naina = $1\frac{1}{2}$

Piece of cake given to Najma = $1\frac{1}{3}$

Piece of cake given to Naina and Najma

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

$$= 2 + \frac{1 \times 3}{2 \times 3} + \frac{1 \times 2}{3 \times 2} = 2 + \frac{3}{6} + \frac{2}{6} = 2 + \frac{5}{6}$$

$$= 2\frac{5}{6}$$

Hence the total amount of piece given to both = $2\frac{5}{6}$.

Q4. Fill in the boxes:

(a) $\square - \frac{5}{8} = \frac{1}{4}$

(b) $\square - \frac{1}{5} = \frac{1}{2}$

(c) $\frac{1}{2} - \square = \frac{1}{6}$

Sol. (a) $\square - \frac{5}{8} = \frac{1}{4}$

Here, missing number is $\frac{1}{4}$ more than $\frac{5}{8}$.

$$\therefore \square = \frac{5}{8} + \frac{1}{4}$$

$$\Rightarrow \square = \frac{5 \times 1 + 1 \times 2}{8}$$

$$\Rightarrow \square = \frac{5+2}{8}$$

$$\Rightarrow \square = \frac{7}{8}$$

Hence $\square = \frac{7}{8}$

(b) $\square - \frac{1}{5} = \frac{1}{2}$

Here, missing number is $\frac{1}{2}$ more than $\frac{1}{5}$.

$$\therefore \square = \frac{1}{5} + \frac{1}{2}$$

$$\Rightarrow \square = \frac{1 \times 2}{5 \times 2} + \frac{1 \times 5}{2 \times 5}$$

$$\Rightarrow \square = \frac{2}{10} + \frac{5}{10}$$

$$\Rightarrow \square = \frac{2+5}{10} = \frac{7}{10}$$

Hence $\square = \frac{7}{10}$

(c) $\frac{1}{2} - \square = \frac{1}{6}$

Here, missing number is $\frac{1}{6}$ less than $\frac{1}{2}$.

$$\therefore \square = \frac{1}{2} - \frac{1}{6}$$

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

$$\Rightarrow \square = \frac{3}{6} - \frac{1}{6}$$

$$\Rightarrow \square = \frac{3-1}{6} = \frac{2}{6}$$

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

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

Q5. Complete the addition-subtraction box.

(a)

	+		
↓	$\frac{2}{3}$	$\frac{4}{3}$	
	$\frac{1}{3}$	$\frac{2}{3}$	

(b)

	+		
↓	$\frac{1}{2}$	$\frac{1}{3}$	
	$\frac{1}{3}$	$\frac{1}{4}$	

Sol. (a) **Addition: I Row** $\frac{2}{3} + \frac{4}{3} = \frac{2+4}{3}$

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

II Row $\frac{1}{3} + \frac{2}{3} = \frac{1+2}{3} = \frac{3}{3} = 1$

Subtraction: I Column: $\frac{2}{3} - \frac{1}{3} = \frac{2-1}{3} = \frac{1}{3}$

II Column: $\frac{4}{3} - \frac{2}{3} = \frac{4-2}{3} = \frac{2}{3}$

Thus the box may be completed as follows:

	$\frac{2}{3}$	$\frac{4}{3}$	②
	$\frac{1}{3}$	$\frac{2}{3}$	①
	$\frac{1}{3}$	$\frac{2}{3}$	1

(b) **Addition: I Row:**

$$\frac{1}{2} + \frac{1}{3} = \frac{1 \times 3 + 1 \times 2}{6} = \frac{3 + 2}{6} = \frac{5}{6}$$

II Row: $\frac{1}{3} + \frac{1}{4} = \frac{1 \times 4 + 1 \times 3}{12} = \frac{4 + 3}{12} = \frac{7}{12}$

Subtraction: I Column:

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

II Column: $\frac{1}{3} - \frac{1}{4} = \frac{1 \times 4 - 1 \times 3}{12} = \frac{4 - 3}{12} = \frac{1}{12}$

Thus, the box may be completed as follows:

	$\frac{1}{2}$	$\frac{1}{3}$	⑤
	$\frac{1}{3}$	$\frac{1}{4}$	⑦
	$\frac{1}{6}$	$\frac{1}{12}$	$\frac{1}{4}$

Q6. A piece of wire $\frac{7}{8}$ metre long broke into two pieces. One piece was $\frac{1}{4}$ metre long. How long is the other piece?

Sol. Total length of the wire = $\frac{7}{8}$ metre

Length of one piece of wire = $\frac{1}{4}$ metre

$$\therefore \text{Length of the other piece} = \frac{7}{8} - \frac{1}{4}$$

LCM of 8 and 4 = 8

$$\therefore \frac{7}{8} - \frac{1}{4} = \frac{7 \times 1}{8 \times 1} - \frac{1 \times 2}{4 \times 2} = \frac{7}{8} - \frac{2}{8} = \frac{7 - 2}{8} = \frac{5}{8}$$

Hence, the length of the other piece = $\frac{5}{8}$ metre.

Q7. Nandini's house is $\frac{9}{10}$ km from her school. She walked some distance and then took a bus for $\frac{1}{2}$ km to reach the school. How far did she walk?

Sol. Total distance from house to school = $\frac{9}{10}$ km.

Distance travelled by Nandini by bus = $\frac{1}{2}$ km

\therefore Distance travelled by her on foot

$$= \frac{9}{10} \text{ km} - \frac{1}{2} \text{ km} = \left(\frac{9}{10} - \frac{1}{2} \right) \text{ km}$$

LCM of 10 and 2 = 10

$$\begin{aligned} \therefore \left(\frac{9}{10} - \frac{1}{2} \right) \text{ km} &= \left(\frac{9 \times 1}{10 \times 1} - \frac{1 \times 5}{2 \times 5} \right) \text{ km} \\ &= \left(\frac{9}{10} - \frac{5}{10} \right) \text{ km} = \left(\frac{9 - 5}{10} \right) \text{ km} \\ &= \frac{4}{10} \text{ km} = \frac{2}{5} \text{ km} \end{aligned}$$

Hence, the distance travelled by her on foot = $\frac{2}{5}$ km.

Q8. Asha and Samuel have bookshelves of the same size partly filled with books. Asha's shelf is $\frac{5}{6}$ th full and Samuel's shelf is $\frac{2}{5}$ th full. Whose bookshelf is more full? By what fraction?

Sol. Asha's shelf is $\frac{5}{6}$ th full

and Samuel's shelf is $\frac{2}{5}$ th full

Comparing $\frac{5}{6}$ and $\frac{2}{5}$

LCM of 6 and 5 = 30

$$\therefore \frac{5 \times 5}{6 \times 5} = \frac{25}{30} \text{ and } \frac{2 \times 6}{5 \times 6} = \frac{12}{30}$$

Hence, $25 > 12$, So $\frac{5}{6}$ is more than $\frac{2}{5}$.

Hence, Asha's shelf is full more than Samuel's shelf.

$$\text{Now, } \frac{5}{6} - \frac{2}{5} = \frac{25}{30} - \frac{12}{30} = \frac{25 - 12}{30} = \frac{13}{30}$$

Hence, $\frac{13}{30}$ th fraction is more full of Asha's shelf.

Q9. Jaidev takes $2\frac{1}{5}$ minutes to walk across the school ground. Rahul takes $\frac{7}{4}$ minutes to do the same. Who takes less time and by what fraction?

Sol. Jaidev takes $2\frac{1}{5}$ minutes

Rahul takes $\frac{7}{4}$ minutes

Comparing $2\frac{1}{5}$ minutes and $\frac{7}{4}$ minutes

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

Now, the given fractions are $\frac{11}{5}$ and $\frac{7}{4}$

$$\frac{11}{5} \times \frac{4}{4} = \frac{44}{20} \text{ and } \frac{7}{4} \times \frac{5}{5} = \frac{35}{20}$$

Here, $35 < 44 \therefore \frac{7}{4} < \frac{11}{5}$.

So, the time take to cover the same distance by Rahul is less than that of Jaidev.

$$\frac{11}{5} - \frac{7}{4} = \frac{44}{20} - \frac{35}{20} = \frac{44-35}{20} = \frac{9}{20} \text{ minutes}$$

Hence, Rahul takes $\frac{9}{20}$ minutes less to across the school ground.

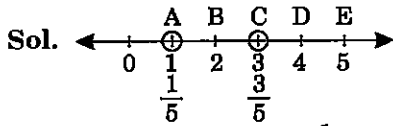
Learning More Q & A

I. VERY SHORT ANSWER (VSA) QUESTIONS

Q1. Represent the following fractions on number line.

(a) $\frac{1}{5}$

(b) $\frac{3}{5}$

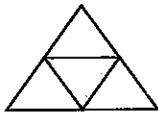


Point A represents $\frac{1}{5}$

Point C represents $\frac{3}{5}$

Q2. Write the fractions showing the shaded portions:

(a)



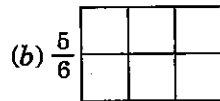
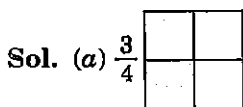
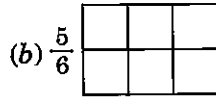
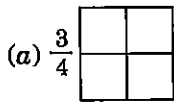
(b)



Sol. (a) Shaded portion represents $\frac{1}{4}$

Shaded portion represents $\frac{2}{6}$

Q3. Colour the part according to the fraction given:



Q4. Identify the proper and improper fractions:

$$\frac{5}{6}, \frac{7}{2}, \frac{1}{2}, \frac{3}{4}, \frac{11}{5}, \frac{6}{5}$$

Sol. Proper fractions are: $\frac{5}{6}, \frac{1}{2}$ and $\frac{3}{4}$

Improper fractions are: $\frac{7}{2}, \frac{11}{5}$ and $\frac{6}{5}$

Q5. What fraction of these circles have 'x' in them?



Sol. Fraction of the circles with 'x' in the given figure = $\frac{5}{8}$

Q6. Write all the natural numbers from 1 to 15. What fraction of them are prime numbers?

Sol. Natural numbers from 1 to 15 are

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15

Prime numbers from 1 to 15 are 2, 3, 5, 7, 11, 13, i.e., 6 prime numbers.

\therefore Fraction of prime numbers = $\frac{6}{15}$

Q7. Identify the like fractions from the following:

$$\frac{2}{3}, \frac{1}{3}, \frac{5}{6}, \frac{3}{4}, \frac{6}{5}$$

Sol. $\frac{2}{3}$ and $\frac{1}{3}$ have the same denominator.

$\therefore \frac{2}{3}$ and $\frac{1}{3}$ are the like fractions.

Q8. Identify the unlike fractions from the following:

$$\frac{2}{5}, \frac{2}{7}, \frac{1}{6}, \frac{3}{7}, \frac{5}{7}$$

Sol. $\frac{2}{5}, \frac{2}{7}$ and $\frac{1}{6}$ have different denominators.

$\therefore \frac{2}{5}, \frac{2}{7}$ and $\frac{1}{6}$ are unlike fractions.

Q9. Convert the following improper fractions into mixed fraction.

(a) $\frac{37}{6}$

(b) $\frac{13}{2}$

Sol. (a) $\frac{37}{6}$

$$6 \overline{)37} \begin{array}{r} 6 \\ -36 \\ \hline 1 \end{array}$$

$$\therefore \frac{37}{6} = 6\frac{1}{6}$$

(mixed fraction)

(b) $\frac{13}{2}$ $2 \overline{)13} \begin{array}{r} 6 \\ -12 \\ \hline 1 \end{array}$

$$\therefore \frac{13}{2} = 6\frac{1}{2} \quad (\text{mixed fraction})$$

Q10. Convert the following mixed fractions into improper fractions:

$$(a) 5\frac{2}{3} \quad (b) 6\frac{5}{6}$$

$$\begin{aligned} \text{Sol. (a) } 5\frac{2}{3} &= 5 + \frac{2}{3} = \frac{5}{1} + \frac{2}{3} = \frac{5 \times 3}{1 \times 3} + \frac{2 \times 1}{3 \times 1} \\ &= \frac{15}{3} + \frac{2}{3} = \frac{15+2}{3} = \frac{17}{3} \end{aligned}$$

$$\therefore 5\frac{2}{3} = \frac{17}{3} \quad (\text{improper fraction})$$

$$\begin{aligned} (b) 6\frac{5}{6} &= 6 + \frac{5}{6} = \frac{6}{1} + \frac{5}{6} = \frac{6 \times 6}{1 \times 6} + \frac{5 \times 1}{6 \times 1} \\ &= \frac{36}{6} + \frac{5}{6} = \frac{36+5}{6} = \frac{41}{6} \end{aligned}$$

$$\therefore 6\frac{5}{6} = \frac{41}{6} \quad (\text{improper fraction})$$

II. SHORT ANSWER (SA) QUESTIONS

Q11. Write the following fractions in ascending order:

$$\frac{2}{3}, \frac{2}{7}, \frac{2}{11}, \frac{2}{5} \text{ and } \frac{2}{9}$$

Sol. Here, the numerators of all the fractions are same.

$$\therefore \text{Ascending order is } \frac{2}{11}, \frac{2}{9}, \frac{2}{7}, \frac{2}{5}, \frac{2}{3}$$

Q12. Write any

(a) three proper and three improper fractions with denominator 7.

(b) two proper and two improper fractions with numerator 9.

Sol. (a) Proper fractions with denominator 7 are:

$$\frac{2}{7}, \frac{3}{7} \text{ and } \frac{5}{7}$$

Improper fractions with denominator 7 are:

$$\frac{9}{7}, \frac{11}{7} \text{ and } \frac{13}{7}$$

(b) Proper fractions with numerator 9 are

$$\frac{9}{11} \text{ and } \frac{9}{17}$$

Improper fractions with numerator 9 are

$$\frac{9}{2} \text{ and } \frac{9}{5}$$

Q13. Compare the following fractions:

$$(a) \frac{4}{5} \text{ and } \frac{5}{6} \quad (b) \frac{3}{4} \text{ and } \frac{2}{5}$$

$$\text{Sol. (a) } \frac{4}{5} \text{ and } \frac{5}{6}$$

LCM of 5 and 6 = 30

$$\therefore \frac{4}{5} = \frac{4 \times 6}{5 \times 6} = \frac{24}{30}$$

$$\text{and } \frac{5}{6} = \frac{5 \times 5}{6 \times 5} = \frac{25}{30}$$

$$\text{Here, } 24 < 25 \Rightarrow \frac{24}{30} < \frac{25}{30}$$

$$\therefore \frac{4}{5} < \frac{5}{6}$$

$$(b) \frac{3}{4} \text{ and } \frac{2}{5}$$

LCM of 4 and 5 = 20

$$\therefore \frac{3}{4} = \frac{3 \times 5}{4 \times 5} = \frac{15}{20}$$

$$\text{and } \frac{2}{5} = \frac{2 \times 4}{5 \times 4} = \frac{8}{20}$$

$$\text{Here, } 15 > 8 \Rightarrow \frac{15}{20} > \frac{8}{20}$$

$$\therefore \frac{3}{4} > \frac{2}{5}$$

$$\text{Q14. Add } \frac{7}{12}, \frac{5}{16} \text{ and } \frac{9}{24}.$$

Sol. LCM of 12, 16 and 24 is 48

$$\begin{array}{r} 2 \overline{) 12, 16, 24} \\ 2 \overline{) 6, 8, 12} \\ 2 \overline{) 3, 4, 6} \\ 2 \overline{) 3, 2, 3} \\ 3 \overline{) 3, 1, 3} \\ \hline 1, 1, 1 \end{array}$$

$$\therefore \text{LCM} = 2 \times 2 \times 2 \times 2 \times 3 = 48$$

$$\therefore \frac{7}{12} = \frac{7 \times 4}{12 \times 4} = \frac{28}{48} \quad (\because 48 \div 12 = 4)$$

$$\frac{5}{16} = \frac{5 \times 3}{16 \times 3} = \frac{15}{48} \quad (\because 48 \div 16 = 3)$$

$$\frac{9}{24} = \frac{9 \times 2}{24 \times 2} = \frac{18}{48} \quad (\because 48 \div 24 = 2)$$

$$\therefore \frac{7}{12} + \frac{5}{16} + \frac{9}{24} = \frac{28}{48} + \frac{15}{48} + \frac{18}{48}$$

$$\begin{array}{r} 1 \\ 48 \overline{) 61} \\ \underline{-48} \\ 13 \\ \hline = \frac{61}{48} = 1\frac{13}{48} \end{array}$$

Q15. Find the sum of $1\frac{2}{3}$ and $3\frac{2}{5}$.

$$\text{Sol. } 1\frac{2}{3} + 3\frac{2}{5} = 1 + \frac{2}{3} + 3 + \frac{2}{5} = 1 + 3 + \frac{2}{3} + \frac{2}{5}$$

$$\begin{aligned}
 &= 4 + \left(\frac{2 \times 5}{3 \times 5} + \frac{2 \times 3}{5 \times 3} \right) = 4 + \left(\frac{10}{15} + \frac{6}{15} \right) \\
 &= 4 + \frac{(10+6)}{15} = 4 + \frac{16}{15} = 4 + 1 + \frac{1}{15} \\
 &= 5 + \frac{1}{15} = 5 \frac{1}{15}
 \end{aligned}$$

Hence, $1\frac{2}{3} + 3\frac{2}{5} = 5\frac{1}{15}$

Q16. Subtract $2\frac{3}{4}$ from $4\frac{1}{8}$.

Sol. $4\frac{1}{8} - 2\frac{3}{4} = \frac{(4 \times 8) + 1}{8} - \frac{(2 \times 4) + 3}{4} = \frac{32 + 1}{8} - \frac{8 + 3}{4}$

$$= \frac{33}{8} - \frac{11}{4}$$

LCM of 8 and 4 is 8

$$\begin{aligned}
 \therefore \frac{33 \times 1}{8 \times 1} - \frac{11 \times 2}{4 \times 2} &= \frac{33}{8} - \frac{22}{8} \\
 &= \frac{33 - 22}{8} = \frac{11}{8} = 1\frac{3}{8}
 \end{aligned}$$

Hence, $4\frac{1}{8} - 2\frac{3}{4} = 1\frac{3}{8}$

Q17. Insert > or < to make each of the following true.

(a) $\frac{6}{7} \square \frac{5}{7}$ (b) $\frac{10}{21} \square \frac{10}{12}$ (c) $\frac{3}{7} \square \frac{3}{8}$

Sol. (a) $\frac{6}{7} \square \frac{5}{7}$

Here, denominators are same, i.e., 7 and 6 > 5

$$\therefore \frac{6}{7} \square > \frac{5}{7}$$

(b) $\frac{10}{21} \square \frac{10}{12}$

Here, numerators are same, i.e., 10 and 21 > 12

$$\therefore \frac{10}{21} \square < \frac{10}{12}$$

(c) $\frac{3}{7} \square \frac{3}{8}$

Here, numerators are same, i.e., 3 and 7 < 8

$$\therefore \frac{3}{7} \square > \frac{3}{8}$$

III. HIGHER ORDER THINKING SKILLS (HOTS) QUESTIONS

Q18. Find the difference between the greatest and the smallest fractions.

$$3\frac{3}{5}, 2\frac{4}{7}, \frac{19}{6}, \frac{18}{8}$$

Sol. We have $3\frac{3}{5}, 2\frac{4}{7}, \frac{19}{6}, \frac{18}{8}$

$$3\frac{3}{5} = \frac{(3 \times 5) + 3}{5} = \frac{15 + 3}{5} = \frac{18}{5}$$

$$2\frac{4}{7} = \frac{(2 \times 7) + 4}{7} = \frac{14 + 4}{7} = \frac{18}{7}$$

Improper form of all the fractions are

$$\frac{18}{5}, \frac{18}{7}, \frac{19}{6} \text{ and } \frac{18}{8}$$

$$\begin{array}{r}
 2 \mid 5, 7, 6, 8 \\
 \hline
 2 \mid 5, 7, 3, 4 \\
 \hline
 2 \mid 5, 7, 3, 2 \\
 \hline
 3 \mid 5, 7, 1, 1 \\
 \hline
 5 \mid 1, 7, 1, 1 \\
 \hline
 7 \mid 1, 1, 1, 1 \\
 \hline
 1, 1, 1, 1
 \end{array}$$

$$\text{LCM} = 2 \times 2 \times 2 \times 3 \times 5 \times 7 = 840$$

$$\text{LCM of } 5, 7, 6 \text{ and } 8 = 840$$

Making the denominators same, we have

$$\frac{18}{5} = \frac{18 \times 168}{5 \times 168} = \frac{3024}{840} \quad [\because 840 \div 5 = 168]$$

$$\frac{18}{7} = \frac{18 \times 120}{7 \times 120} = \frac{2160}{840} \quad [\because 840 \div 7 = 120]$$

$$\frac{19}{6} = \frac{19 \times 140}{6 \times 140} = \frac{2660}{840} \quad [\because 840 \div 6 = 140]$$

$$\frac{18}{8} = \frac{18 \times 105}{8 \times 105} = \frac{1890}{840} \quad [\because 840 \div 8 = 105]$$

Here $\frac{3024}{840}$ or $\frac{18}{5}$ is the greatest fraction and

$\frac{1890}{840}$ or $\frac{18}{8}$ is the smallest fraction.

Difference

$$= \frac{18}{5} - \frac{18}{8} = \frac{18 \times 8}{5 \times 8} - \frac{18 \times 5}{8 \times 5} = \frac{144}{40} - \frac{90}{40}$$

$$= \frac{54}{40} = \frac{27}{20}$$

Hence the required difference = $\frac{27}{20}$ or $1\frac{7}{20}$

Q19. Simran painted $\frac{2}{3}$ of the wall space in her room. Her brother Rahul helped and painted $\frac{1}{5}$ of the

wall space. How much did they paint together?

What part of the whole space is left unpainted?

Sol. Space of the wall painted by Simran = $\frac{2}{3}$

Space of the wall painted by Rahul = $\frac{1}{5}$

$$\begin{aligned} \text{Total space painted by both} &= \frac{2}{3} + \frac{1}{5} \\ &= \frac{2 \times 5}{3 \times 5} + \frac{1 \times 3}{5 \times 3} = \frac{10}{15} + \frac{3}{15} = \frac{10+3}{15} = \frac{13}{15} \end{aligned}$$

$$\text{Unpainted space of the wall} = 1 - \frac{13}{15}$$

$$\begin{aligned} &= \frac{1}{1} - \frac{13}{15} = \frac{1 \times 15}{1 \times 15} - \frac{13 \times 1}{15 \times 1} \\ &= \frac{15}{15} - \frac{13}{15} = \frac{15-13}{15} = \frac{2}{15} \end{aligned}$$

Hence $\frac{2}{15}$ th of the wall space is unpainted.

Test Yourself

I. VERY SHORT ANSWER (VSA) QUESTIONS

- Q1. What fractions of an hour is 20 minutes?
Q2. What fractions of these circles have Y's in them?



- Q3. Represent a fraction $\frac{2}{3}$ on number line.
Q4. Fill up the blank using one of these '<' or '>'.
(a) $\frac{1}{3} \square 1$ (b) $\frac{2}{5} \square \frac{2}{3}$ (c) $\frac{2}{7} \square \frac{2}{8}$

- Q5. Express the mixed fractions $5\frac{2}{7}$ as improper fraction.

- Q6. Express the improper fractions $\frac{19}{4}$ as the mixed fractions.

- Q7. Write three equivalent fractions of $\frac{2}{5}$.

- Q8. Find the equivalent fraction of $\frac{3}{7}$ with numerator 6.

- Q9. Find the simplest form of the fraction $\frac{36}{80}$.

- Q10. Which is the larger fraction?

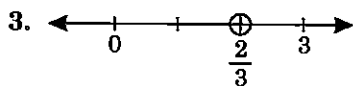
$$\frac{2}{3} \text{ or } \frac{2}{5}$$

II. SHORT ANSWER (SA) QUESTIONS

- Q11. Write the given fractions in ascending order and descending order.

$$\frac{1}{5}, \frac{7}{5}, \frac{13}{5}, \frac{11}{5}, \frac{8}{5}$$

$$1. \frac{1}{3} \qquad \qquad \qquad 2. \frac{3}{8}$$



4. (a) $\square <$ (b) $\square <$ (c) $\square <$

- Q12. Find the difference between $\frac{5}{8}$ and $\frac{5}{12}$.

- Q13. Two thick wires are respectively $5\frac{1}{4}$ m and $6\frac{3}{5}$ m long. Find the total lengths of the two wires.

- Q14. Roshni travelled $20\frac{2}{5}$ km by car, $14\frac{1}{10}$ km by bus and $215\frac{3}{20}$ km by train. Find the total distance travelled by her.

- Q15. A man spends $\frac{2}{3}$ of his salary on rations, $\frac{1}{5}$ of it on clothes and $\frac{1}{10}$ of it on rent. What part of his salary does he spend?

- Q16. Simplify the following:

$$(i) 8\frac{3}{8} - 6\frac{2}{9} \qquad \qquad (ii) 3\frac{6}{7} + 4\frac{5}{10}$$

- Q17. Reduce to simplest form:

$$(a) \frac{250}{600} \qquad \qquad (b) \frac{324}{400}$$

- Q18. Represent the following on number line.

$$(i) \frac{7}{6} \qquad \qquad (ii) \frac{3}{4}$$

- Q19. What should be added to $\frac{3}{5}$ to get $\frac{3}{4}$?

- Q20. Subtract the smallest from the greatest

$$\frac{2}{3}, \frac{5}{6}, \frac{3}{8}, \frac{5}{9}$$

ANSWERS

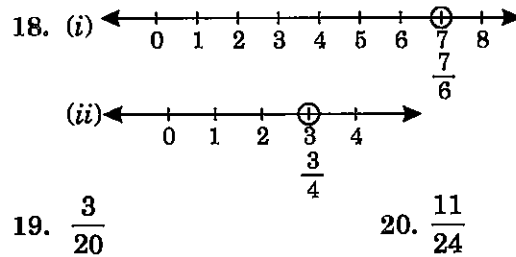
$$5. \frac{37}{7} \qquad 6. 4\frac{3}{4} \qquad 7. \frac{4}{10}, \frac{6}{15}, \frac{8}{20}$$

$$8. \frac{6}{14} \qquad 9. \frac{9}{20} \qquad 10. \frac{2}{3}$$

$$11. \text{Ascending order: } \frac{1}{5}, \frac{7}{5}, \frac{8}{5}, \frac{11}{5}, \frac{13}{5};$$

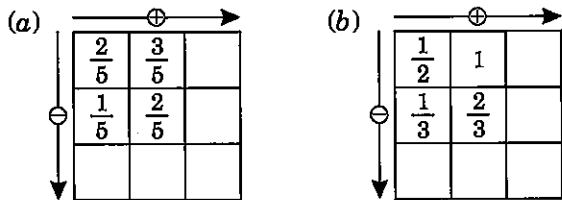
$$\text{Descending order: } \frac{13}{5}, \frac{11}{5}, \frac{8}{5}, \frac{7}{5}, \frac{1}{5}$$

12. $\frac{5}{24}$ 13. $11\frac{17}{20}$ m 14. $249\frac{13}{20}$ km
 15. $\frac{29}{30}$ 16. (i) $2\frac{11}{72}$ (ii) $8\frac{5}{14}$
 17. (a) $\frac{5}{12}$ (b) $\frac{81}{100}$



Internal Assessment

Q1. Complete the addition-subtraction box



Q2. Fill in the blanks.

- (a) $\frac{1}{2}$ is ... than $\frac{1}{3}$.
 (b) Sum of $\frac{1}{2}$ and $\frac{1}{3}$ is equal to
 (c) A is a number representing a part of whole.
 (d) In a fraction, the numerator is always less than the denominator.
 (e) The numerator of $\frac{7}{13}$ is
 (f) Fractions having the same value are called fractions.

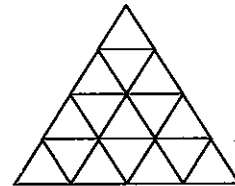
Q3. Which of the following is an improper fraction?

- (a) $\frac{2}{3}$ (b) $\frac{7}{3}$ (c) $\frac{5}{6}$ (d) $\frac{1}{2}$

Q4. Which of the following is the simplest form of $\frac{24}{108}$?

- (a) $\frac{2}{9}$ (b) $\frac{1}{9}$
 (c) $\frac{4}{9}$ (d) None of these

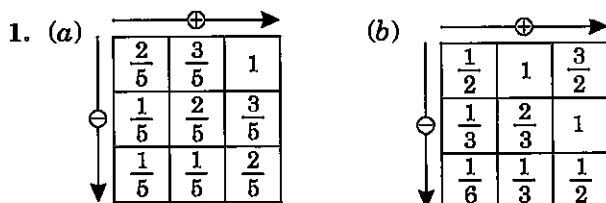
Q5. Shade $\frac{7}{16}$ of the following.



Q6. Match the equivalent fractions.

- (i) $\frac{36}{108}$ (a) $\frac{1}{3}$
 (ii) $\frac{35}{105}$ (b) $\frac{1}{5}$
 (iii) $\frac{120}{600}$ (c) $\frac{3}{9}$
 (iv) $\frac{60}{72}$ (d) $\frac{5}{6}$
 (v) $\frac{36}{80}$ (e) $\frac{3}{4}$
 (vi) $\frac{45}{60}$ (f) $\frac{9}{20}$

ANSWERS

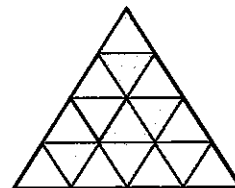


2. (a) greater
 (c) fraction
 (e) 7

- (b) $\frac{5}{6}$
 (d) proper
 (f) equivalent

3. (b) 4. (a)

5.



6. (i) ↔ (c) (ii) ↔ (a)
 (iii) ↔ (b) (iv) ↔ (d)
 (v) ↔ (f) (vi) ↔ (e)

◆ Half Yearly Assessment

SET-1

Time: 3 hour

M.M.: 80

General Instructions

- All questions are compulsory. However there is an internal choice.
- Section A consists of 4 questions carrying 1 mark each.
- Section B consists of 5 questions carrying 2 marks each.
- Section C consists of 10 questions carrying 3 marks each.
- Section D consists of 9 questions carrying 4 marks each.

SECTION-A

1. Write the number corresponding to each of the following:
(a) $7000 + 500 + 9$ (b) $6000 + 30 + 6$
2. A cricket player so far scored 5986 runs in test matches. He wishes to complete 10,000 runs. How many more runs does he need?
3. What is the successor of the following:
(a) 39,999 (b) 3000
4. Give three examples of three even prime numbers.

SECTION-B

5. Find the HCF of 70, 105 and 175.
6. Find the LCM of 24, 48 and 80.
7. Represent $(-4) + (+7)$ on the number line.
8. Show the fraction $\frac{3}{5}$ on number line.
9. Convert the following in improper fraction:

(a) $13\frac{1}{5}$

(b) $4\frac{3}{4}$

(c) $1\frac{5}{7}$

(d) $3\frac{3}{8}$

SECTION-C

10. What should be added to $19\frac{2}{3}$ to get $23\frac{1}{2}$?
11. Solve: $3\frac{1}{4} + 3\frac{3}{4} - \frac{1}{5}$.
12. Rewrite the following in ascending order 8.2, 8.02, 8.7, 8.17, 8.003
13. What should be added to the difference of 5.24 and 2.163 to get 8.5?
14. Think of a number. Multiply it by 6 and add 7 to the result. Subtract x from the result. What is the final outcome?
15. If $x = 2$, $y = -1$ and $z = 3$, find the value of $2xy^4 - 5x^2 + z^2 + xy$.
16. The length of rectangle is 3 cm more than its breadth and its perimeter is 34 cm. Find the length and breadth of the rectangle.
17. Rohan works in a factory and earns ₹ 3375 per month. He saves ₹ 250 every month. Find the ratio of his savings to his income.

18. Find the mean proportions between 16 and 441.
 19. Pradeep pays ₹ 9600 as rent for 3 months. How much does he have to pay for a whole year?

SECTION-D

20. The boys to girls ratio in a school is 11:10. How many girls students are there, if 605 boys are enrolled in school?
 21. If the first three terms of proportions are 9, 8 and 54 respectively, find the fourth term.
 22. Divide ₹ 4230 among Rajeev, Rohan and Rajat so that their shares are in the ratio $\frac{1}{3} : \frac{1}{4} : \frac{1}{5}$.
 23. Solve: $\frac{x}{3} - \frac{x}{4} = 5$ and check the answer.
 24. Ravi purchased 6 kg 400 g rice, 3 kg 50 g sugar and 12 kg 750 g flour. Find the total weight of his purchases.

OR

Roshan buys exercise books worth ₹ 56.75, pencils for ₹ 26.30 and geometry box for ₹ 42.25. How much he has to pay for purchases?

25. Arrange the following in descending order: $\frac{5}{9}, \frac{7}{12}, \frac{13}{36}, \frac{17}{18}$
 26. The HCF and LCM of two numbers are 8 and 576 respectively. If one number is 64, find the other number.
 27. Find the smallest number which when diminished by 6 is divisible by 12, 15, 20 and 27.
 28. The length, breadth and height of a room are 825 cm, 675 cm and 450 cm respectively. Find the longest tape which can measure the three dimensions of the room exactly.

◇ Half Yearly Assessment

SET-2

Time: 3 hour

M.M.: 80

General Instructions: Same as paper-1**SECTION-A**

1. Find the value of the following using distributive properties.

$$(6524 \times 69) + (6524 \times 31)$$

2. Which of the following is the greatest of all:

$$\frac{3}{5}, \frac{3}{4}, \frac{2}{7}, \frac{1}{2}$$

3. Simplify:
- $5\frac{2}{3} + 3\frac{1}{5}$

4. Write the following as decimals:
- $30 + 8 + \frac{4}{10} + \frac{1}{100}$

SECTION-B

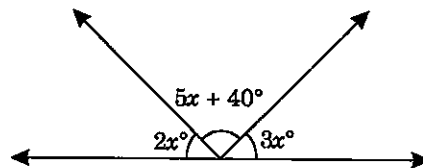
5. Solve for
- y
- :
- $\frac{5y - 4}{3} = 7$

6. Compare the given ratio 5:12 and 9:16.

7. Find the mean proportions of 100, 256.

8. The cost of 9 m of cloth is ₹ 288. Find the cost of 5 m of cloth.

9. Find
- x
- :

**SECTION-C**

10. Write the following in Roman Numerals:

(i) 98

(ii) 140

11. Find the value of the following using distributive property:

$$(429 \times 10 \times 561) - (461 \times 4290)$$

12. Ravi had ₹ 52000. He gave ₹ 9250 to Ajeet, ₹ 12428 to Rajan and ₹ 24962 to Rajeev. How much money was left with him?

13. What is the greatest number that can divide 781 and 458 leaving remainders of 1 and 3 respectively?

14. Find the LCM of 30, 45 and 90.

15. Find the HCF of 24, 36 and 72.

16. The HCF of two numbers is 145 and their LCM is 2175. If one of the numbers is 435, find the other number.

17. Subtract 411 from the sum of
- -325
- and
- -176
- .

18. Write four fractions equivalent to each of the following:

(i) $\frac{5}{7}$

(ii) $\frac{3}{8}$

19. Simplify the following:

(i) $\frac{5}{6} + \frac{1}{4} - \frac{1}{2}$

(ii) $\frac{7}{5} - \frac{1}{10} + \frac{4}{5}$

SECTION-D

20. Ankit covers 48 km 340 m by car, 4 km 70 m by rickshaw, and 40 m on foot. Find the total distance covered by him.

21. If $x = 2$, $y = -1$ and $z = 3$, find the value of $2xy^4 - 5x^2 + z^2 + xy$.

22. Harish cycles a distance of 18 km in 3 hours and Akhtar covers a distance of 64 km in 2 hours by car. Find the ratio of their speeds.

23. Arrange the following fractions in ascending order.

$$\frac{1}{9}, \frac{5}{18}, \frac{13}{24} \text{ and } \frac{3}{4}$$

OR

Simplify: $4\frac{2}{3} - 3\frac{1}{4} + 2\frac{1}{6}$

24. Find the least number from which if 35 is subtracted, the result is exactly divisible by 12, 18, 20, 21, 28 and 30.

25. Find the least number which when divided by 6, 15 and 18 leave remainder 5 in each case.

26. The number of students in each class of a school is 50. The fee paid by each student is ₹ 406 per month. If there are 20 classes in the school, what is the total fee collections in a month?

27. Match the following:

(a) 125

(i) CDLXXIX

(b) 331

(ii) CCXLVIII

(c) 248

(iii) CXXV

(d) 479

(iv) CCCXXXI

28. Medicine is packed in boxes, each weighing 4 kg 500 g. How many such boxes can be loaded in a van which can not carry beyond 800 kg?