

CHAPTER

7

VI-MATHEMATICS-NCERT(2024-25)

7. FRACTIONS (Notes)

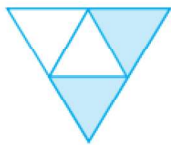
PREPARED BY: BALABHADRA SURESH

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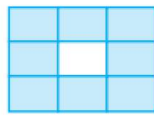
1. A fraction is a number representing a part of a whole. This whole may be a single object or a group of objects
2. When expressing a situation of counting parts to write a fraction, it must be ensured that all parts are equal.
3. In $\frac{5}{7}$, 5 is called the **numerator** and 7 is called the **denominator**.

EXERCISE 7.1

1. Write the fraction representing the shaded portion.



(i)



(ii)



(iii)



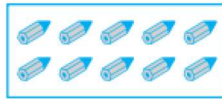
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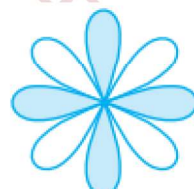
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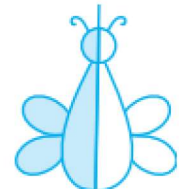
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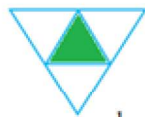
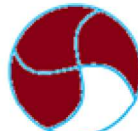
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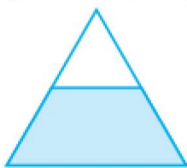
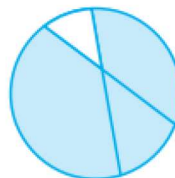
(x)

Sol: (i) $\frac{2}{4}$ (ii) $\frac{8}{9}$ (iii) $\frac{5}{8}$ (iv) $\frac{3}{4}$ (v) $\frac{4}{10}$ (vi) $\frac{8}{12}$ (vii) $\frac{9}{12}$ (viii) $\frac{3}{12}$ (ix) $\frac{4}{10}$ (x) $\frac{4}{8}$

2. 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) $\frac{4}{9}$

3. Identify the error, if any.

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

4. What fraction of a day is 8 hours?

Sol: 1 day = 24 hours

Fraction of a day is 8 hours = $\frac{8}{24}$

5. What fraction of an hour is 40 minutes?

Sol: 1 hour=60 minutes.

Fraction of an hour is 40 minutes = $\frac{40}{60}$

6. 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 the sandwich into 3 equal parts. Each person take 1 part

(b) Each boy receive $\frac{1}{3}$ part of sandwich.

7. 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 Kanchan has to dye=30

Number of dresses she has finished=20

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

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

Sol: Natural numbers from 2 to 12 are 2,3,4,5,6,7,8,9,10,11,12

Prime numbers are 2,3,5,7,11

Required fraction = $\frac{\text{Total given natural numbers}}{\text{Number of prime numbers}} = \frac{5}{11}$

9. 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

Prime numbers are 103,107,109,113

Required fraction = $\frac{\text{Total given natural numbers}}{\text{Number of prime numbers}} = \frac{4}{12}$

10. 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



The required fraction = $\frac{4}{8}$

- 11. 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 Kristin buy=3

Number of CDs received as gift=5

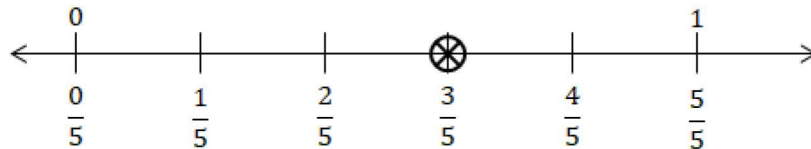
Total number of CDs Kristin has=3+5=8

Fraction of CDs she bought = $\frac{3}{8}$; Fraction of CDs receive as gifts = $\frac{5}{8}$

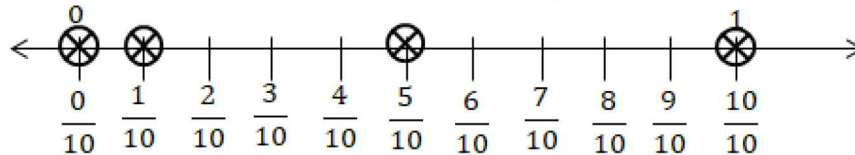
Fraction on the Number Line.

Try These

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

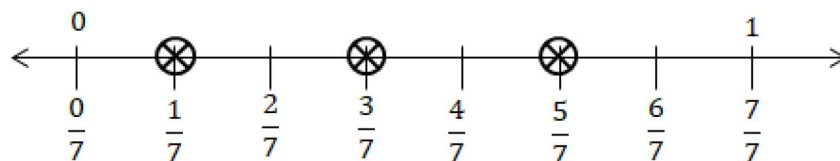
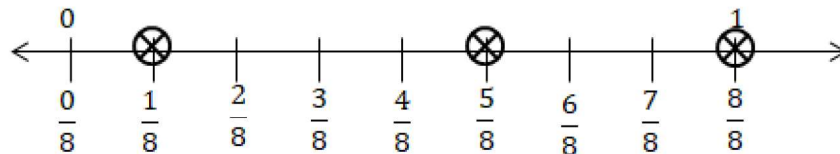


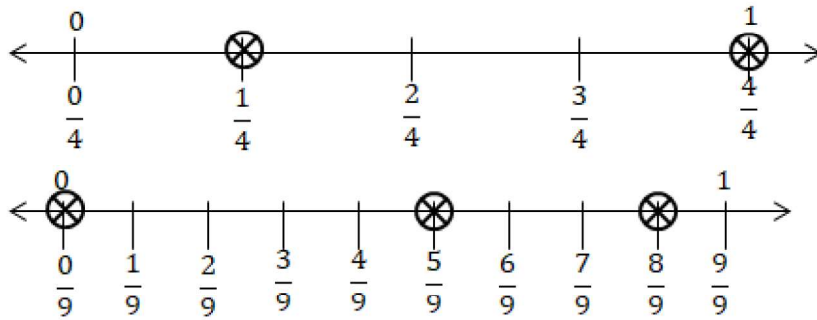
2. Show $\frac{1}{10}$, $\frac{0}{10}$, $\frac{5}{10}$, and $\frac{10}{10}$ on a number line.



3. 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

- (a) Show $\frac{3}{7}$, $\frac{5}{7}$, $\frac{1}{7}$ on a number line





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

Sol: There are infinite number of fractions lie between 0 and 1.

Proper Fractions:

In a fraction the numerator is always less than the denominator is called Proper fraction.

Proper fraction value always less than 1.

Try These

1. Give a proper fraction :

(a) whose numerator is 5 and denominator is 7.

Sol: $\frac{5}{7}$

(b) whose denominator is 9 and numerator is 5.

Sol: $\frac{5}{9}$

(c) whose numerator and denominator add up to 10. How many fractions of this kind can you make?

Sol: $\frac{1}{9}, \frac{2}{8}, \frac{3}{7}, \frac{4}{6}, \frac{5}{5}, \frac{6}{4}, \frac{7}{3}, \frac{8}{2}, \frac{9}{1}$

There are 9 fractions

(d) whose denominator is 4 more than the numerator. (Give any five. How many more can you make?)

Sol: $\frac{1}{5}, \frac{2}{6}, \frac{3}{7}, \frac{4}{8}, \frac{5}{9}, \frac{6}{10}, \dots$ We write infinite fractions.

2. 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 the numerator is less than denominator then the fraction is less than 1.

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

3. 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) $\frac{2005}{2005} = 1$

Improper and Mixed Fractions

The fractions, where the numerator is bigger than the denominator are called improper fractions.

Ex: $\frac{3}{2}, \frac{12}{7}, \frac{15}{9}, \dots$

1. Write five improper fractions with denominator 7.

Sol: $\frac{10}{7}, \frac{11}{7}, \frac{12}{7}, \frac{13}{7}, \frac{14}{7}$

2. Write five improper fractions with numerator 11.

Sol: $\frac{11}{2}, \frac{11}{3}, \frac{11}{4}, \frac{11}{5}, \frac{11}{6}$

Mixed Fractions:

A mixed fraction has a combination of a whole and a part (Whole number and proper fraction)

Ex: $2\frac{3}{5}, 3\frac{5}{9}, 4\frac{7}{11}, \dots$

The mixed fraction will be written as $\text{Quotient} \frac{\text{Remainder}}{\text{Divisor}}$.

Example 1 : Express the following as mixed fractions :

Sol: (a) $\frac{17}{4} = 4\frac{1}{4}$
$$\begin{array}{r} 4 \overline{)17} \\ (-)16 \\ \hline 1 \end{array}$$

(b) $\frac{11}{3} = 3\frac{2}{3}$
$$\begin{array}{r} 3 \overline{)11} \\ (-)9 \\ \hline 2 \end{array}$$

(c) $\frac{27}{5} = 5\frac{2}{5}$
$$\begin{array}{r} 5 \overline{)27} \\ (-)25 \\ \hline 2 \end{array}$$

(d) $\frac{7}{3} = 2\frac{1}{3}$
$$\begin{array}{r} 2 \overline{)7} \\ (-)6 \\ \hline 1 \end{array}$$

Alternate method:

(a) $\frac{17}{4} = \frac{16+1}{4} = \frac{16}{4} + \frac{1}{4} = 4 + \frac{1}{4} = 4\frac{1}{4}$

(c) $\frac{27}{5} = \frac{25+2}{5} = \frac{25}{5} + \frac{2}{5} = 5 + \frac{2}{5} = 5\frac{2}{5}$

(b) $\frac{11}{3} = \frac{9+2}{3} = \frac{9}{3} + \frac{2}{3} = 3 + \frac{2}{3} = 3\frac{2}{3}$

(d) $\frac{7}{3} = \frac{6+1}{3} = \frac{6}{3} + \frac{1}{3} = 2 + \frac{1}{3} = 2\frac{1}{3}$

Mixed fractions as improper fraction:

$$\text{Whole} \frac{\text{Numerator}}{\text{Denominator}} = \frac{(\text{Whole} \times \text{Denominator}) + \text{Numerator}}{\text{Denominator}}$$

Example 2 : Express the following mixed fractions as improper fractions:

$$\text{Sol: (a) } 2\frac{3}{4} = \frac{(2 \times 4) + 3}{4} = \frac{8 + 3}{4} = \frac{11}{4}$$

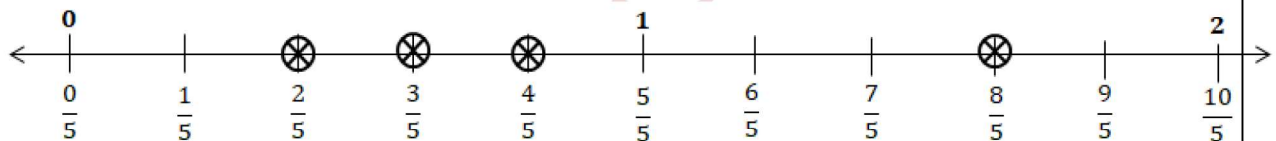
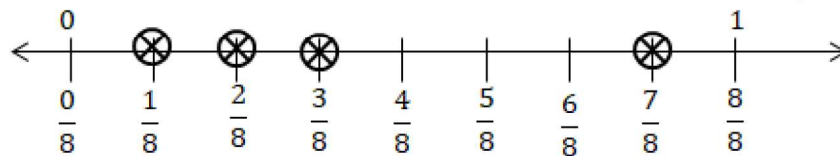
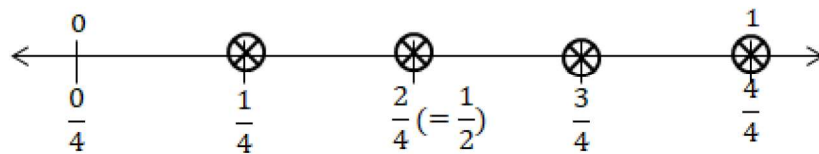
$$(b) 5\frac{3}{7} = \frac{(5 \times 7) + 3}{7} = \frac{35 + 3}{7} = \frac{38}{7}$$

$$(b) 7\frac{1}{9} = \frac{(7 \times 9) + 1}{9} = \frac{63 + 1}{9} = \frac{64}{9}$$

EXERCISE 7.2

1. Draw number lines and locate the points on them :

$$(a) \frac{1}{2}, \frac{1}{4}, \frac{3}{4}, \frac{4}{4} \quad (b) \frac{1}{8}, \frac{2}{8}, \frac{3}{8}, \frac{7}{8} \quad (c) \frac{2}{5}, \frac{3}{5}, \frac{8}{5}, \frac{4}{5}$$



2. Express the following as mixed fractions :

$$\text{Sol: (a) } \frac{20}{3} = 6\frac{2}{3}$$

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

$$(d) \frac{28}{5} = 5\frac{3}{5}$$

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

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

$$(b) \frac{11}{5} = 2\frac{1}{5}$$

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

$$(f) \frac{35}{9} = 3\frac{8}{9}$$

$$(c) \frac{17}{7} = 2\frac{3}{7}$$

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

$$(e) \frac{19}{6} = 3\frac{1}{6}$$

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

3. Express the following as improper fractions :

$$\text{Sol: (a) } 7\frac{3}{4} = \frac{(7 \times 4) + 3}{4} = \frac{28 + 3}{4} = \frac{31}{4}$$

$$(b) 5\frac{6}{7} = \frac{(5 \times 7) + 6}{7} = \frac{35 + 6}{7} = \frac{41}{7}$$

$$(c) 2\frac{5}{6} = \frac{(2 \times 6) + 5}{6} = \frac{12 + 5}{6} = \frac{17}{6}$$

$$(d) 10\frac{3}{5} = \frac{(10 \times 5) + 3}{5} = \frac{50 + 3}{5} = \frac{53}{5}$$

$$(e) 9\frac{3}{7} = \frac{(9 \times 7) + 3}{7} = \frac{63 + 3}{7} = \frac{66}{7}$$

$$(f) 8\frac{4}{9} = \frac{(8 \times 9) + 4}{9} = \frac{72 + 4}{9} = \frac{76}{9}$$

Equivalent Fractions

To find an equivalent fraction of a given fraction, you may multiply or divide both the numerator and the denominator of the given fraction by the **same number**.

Try These

Find five equivalent fractions of each of the following:

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

Sol: $\frac{2}{3} = \frac{2 \times 2}{3 \times 2} = \frac{2 \times 3}{3 \times 3} = \frac{2 \times 4}{3 \times 4} = \frac{2 \times 5}{3 \times 5} = \frac{2 \times 6}{3 \times 6} = \dots$

$$\frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{8}{12} = \frac{10}{15} = \frac{12}{18} = \dots$$

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

Sol: $\frac{1}{5} = \frac{1 \times 2}{5 \times 2} = \frac{1 \times 3}{5 \times 3} = \frac{1 \times 4}{5 \times 4} = \frac{1 \times 5}{5 \times 5} = \frac{1 \times 6}{5 \times 6} = \dots$

$$\frac{1}{5} = \frac{2}{10} = \frac{3}{15} = \frac{4}{20} = \frac{5}{25} = \frac{6}{30} = \dots$$

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

Sol: $\frac{3}{5} = \frac{3 \times 2}{5 \times 2} = \frac{3 \times 3}{5 \times 3} = \frac{3 \times 4}{5 \times 4} = \frac{3 \times 5}{5 \times 5} = \frac{3 \times 6}{5 \times 6} = \dots$

$$\frac{3}{5} = \frac{6}{10} = \frac{9}{15} = \frac{12}{20} = \frac{15}{25} = \frac{18}{30} = \dots$$

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

Sol: $\frac{5}{9} = \frac{5 \times 2}{9 \times 2} = \frac{5 \times 3}{9 \times 3} = \frac{5 \times 4}{9 \times 4} = \frac{5 \times 5}{9 \times 5} = \frac{5 \times 6}{9 \times 6} = \dots$

$$\frac{5}{9} = \frac{10}{18} = \frac{15}{27} = \frac{20}{36} = \frac{25}{45} = \frac{30}{54} = \dots$$

Example 3 : Find the equivalent fraction of $\frac{2}{5}$ with numerator 6.

$$\text{Sol: } \frac{2}{5} = \frac{2 \times 3}{5 \times 3} = \frac{6}{15}$$

Example 4 : Find the equivalent fraction of $\frac{15}{35}$ with denominator 7.

$$\text{Sol: } \frac{15}{35} = \frac{15 \div 5}{35 \div 5} = \frac{3}{7}$$

Example 5 : Find the equivalent fraction of $\frac{2}{9}$ with denominator 63.

$$\text{Sol: } \frac{2}{9} = \frac{x}{63}$$

$$9 \times x = 63 \times 2$$

$$9 \times x = 9 \times 7 \times 2$$

$$9 \times x = 9 \times 14$$

$$x = 14$$

$$\frac{2}{9} = \frac{14}{63}$$

Simplest Form of a Fraction:

A fraction is said to be in the simplest (or lowest) form if its numerator and denominator have no common factor except 1.

Try These

1. Write the simplest form of:

$$\text{Sol: (i) } \frac{15}{75} = \frac{15 \div 5}{75 \div 5} = \frac{3 \div 3}{15 \div 3} = \frac{1}{5}$$

$$\text{(ii) } \frac{16}{72} = \frac{16 \div 8}{72 \div 8} = \frac{2}{9}$$

$$\text{(iii) } \frac{17}{51} = \frac{17 \div 17}{51 \div 17} = \frac{1}{3}$$

$$\text{(iv) } \frac{42}{28} = \frac{42 \div 2}{28 \div 2} = \frac{21 \div 7}{14 \div 7} = \frac{3}{2}$$

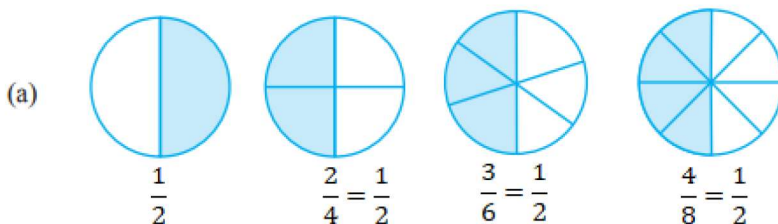
$$\text{(v) } \frac{80}{24} = \frac{80 \div 8}{24 \div 8} = \frac{10}{3}$$

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

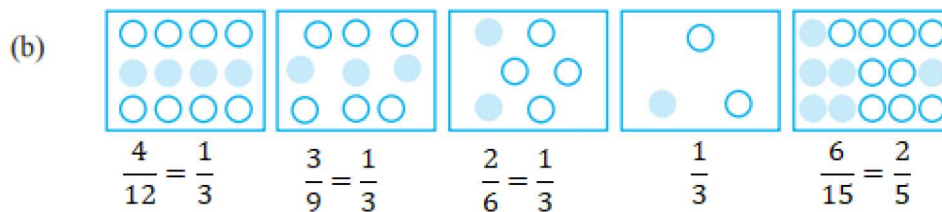
Sol: $\frac{49}{64}$ is in simplest form. Because there is no common factor to 49 and 64 except 1.

EXERCISE 7.3

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

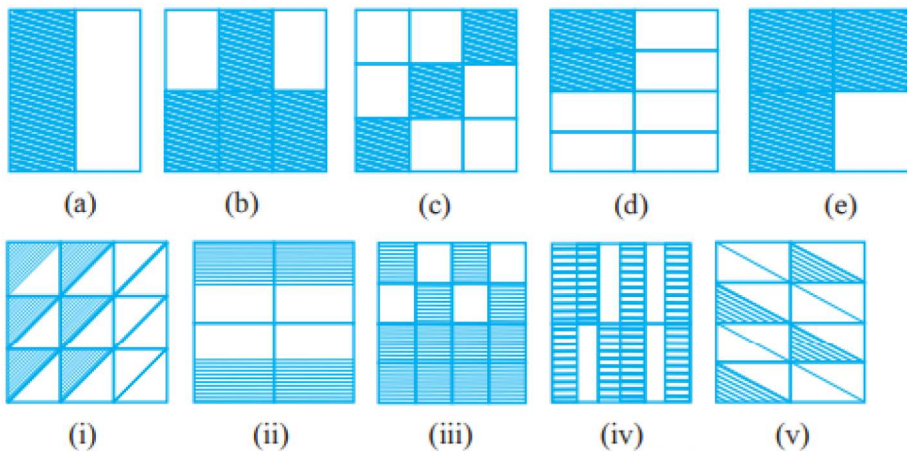


All fractions are equivalent



Expect 5th fraction remaining are all equivalent fractions

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



Sol: (a) $\frac{1}{2}$ (b) $\frac{4}{6} = \frac{2}{3}$ (c) $\frac{3}{9} = \frac{1}{3}$ (d) $\frac{2}{8} = \frac{1}{4}$ (e) $\frac{3}{4}$

(i) $\frac{6}{18} = \frac{1}{3}$ (ii) $\frac{4}{8} = \frac{1}{2}$ (iii) $\frac{12}{16} = \frac{3}{4}$ (iv) $\frac{8}{12} = \frac{2}{3}$ (v) $\frac{4}{16} = \frac{1}{4}$

Pair of equivalent fractions : (a), (ii); (b), (iv); (c), (v); (d), (v); (e), (iii)

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

Sol: (a) $\frac{2}{7} = \frac{2 \times 4}{7 \times 4} = \frac{8}{28}$ (b) $\frac{5}{8} = \frac{5 \times 2}{8 \times 2} = \frac{10}{16}$ (d) $\frac{45}{60} = \frac{45 \div 3}{60 \div 3} = \frac{15}{20}$ (e) $\frac{18}{24} = \frac{18 \div 6}{24 \div 6} = \frac{3}{4}$

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

(a) Denominator 20

Sol: $\frac{3}{5} = \frac{3 \times 4}{5 \times 4} = \frac{12}{20}$

(b) Numerator 9

Sol: $\frac{3}{5} = \frac{3 \times 3}{5 \times 3} = \frac{9}{15}$

(c) Denominator 30

Sol: $\frac{3}{5} = \frac{3 \times 6}{5 \times 6} = \frac{18}{30}$

(d) Numerator 27

Sol: $\frac{3}{5} = \frac{3 \times 9}{5 \times 9} = \frac{27}{45}$

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

(a) numerator 9 (b) denominator 4

Sol: (a) $\frac{36}{48} = \frac{36 \div 4}{48 \div 4} = \frac{9}{12}$

(b) $\frac{36}{48} = \frac{36 \div 12}{48 \div 12} = \frac{3}{4}$

6. Check whether the given fractions are equivalent :

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

Sol: (a) $5 \times 54 = 270$ and $9 \times 30 = 270$ are equal.

So, $\frac{5}{9}, \frac{30}{54}$ are equivalent fractions.

(b) $3 \times 50 = 150$ and $10 \times 12 = 120$ are not equal.

So, $\frac{3}{10}, \frac{12}{50}$ are not equivalent.

(c) $7 \times 11 = 77$ and $13 \times 5 = 65$ are not equal.

So, $\frac{7}{13}, \frac{5}{11}$ are not equivalent.

7. Reduce the following fractions to simplest form :

$$(a) \frac{48}{60} \quad (b) \frac{150}{60} \quad (c) \frac{84}{98} \quad (d) \frac{12}{52} \quad (e) \frac{7}{28}$$

Sol: (a) $\frac{48}{60} = \frac{48 \div 12}{60 \div 12} = \frac{4}{5}$

(b) $\frac{150}{60} = \frac{150 \div 30}{60 \div 30} = \frac{5}{2}$

(c) $\frac{84}{98} = \frac{84 \div 14}{98 \div 14} = \frac{6}{7}$

(d) $\frac{12}{52} = \frac{12 \div 4}{52 \div 4} = \frac{3}{13}$

(e) $\frac{7}{28} = \frac{7 \div 7}{28 \div 7} = \frac{1}{4}$

8. Ramesh had 20 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	Sheelu	Jammal
Used pencils	10	25	40
Total pencils	20	50	80

Fraction of pencils used by Ramesh = $\frac{10}{20} = \frac{1}{2}$

Fraction of pencils used by Sheelu = $\frac{25}{50} = \frac{1}{2}$

Fraction of pencils used by Jammal = $\frac{40}{80} = \frac{1}{2}$

All students used equal fraction of pencils.

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

$$\begin{array}{llll} \text{(i)} \frac{250}{400} & \text{(a)} \frac{2}{3} & \text{(iv)} \frac{180}{360} & \text{(d)} \frac{5}{8} \\ \text{(ii)} \frac{180}{200} & \text{(b)} \frac{2}{5} & \text{(v)} \frac{220}{550} & \text{(e)} \frac{9}{10} \end{array} \quad \begin{array}{l} \text{(iii)} \frac{660}{990} \\ \text{(c)} \frac{1}{2} \end{array}$$

$$\text{Sol: (i)} \frac{250}{400} = \frac{25}{40} = \frac{5}{8} \quad \text{(ii)} \frac{180}{200} = \frac{18}{20} = \frac{9}{10} \quad \text{(iii)} \frac{660}{990} = \frac{66}{99} = \frac{6}{9} = \frac{2}{3}$$

$$\text{(iv)} \frac{180}{360} = \frac{18}{36} = \frac{2}{4} = \frac{1}{2}, \quad \text{(v)} \frac{220}{550} = \frac{22}{55} = \frac{2}{5}$$

$$(i) \rightarrow (d); (ii) \rightarrow (e); (iii) \rightarrow (a); (iv) \rightarrow (c); (v) \rightarrow (b)$$

Like Fractions and unlike fractions.

Fractions with same denominators are called like fractions.

$$\text{Ex: } \frac{1}{15}, \frac{2}{15}, \frac{3}{15}, \frac{8}{15}, \dots$$

Fractions with different denominators are called unlike fractions.

$$\text{Ex: } \frac{2}{9}, \frac{7}{27}, \frac{5}{28}, \dots$$

Comparing Like Fractions:

In two like fractions (the denominators are same) the greater numerator fraction is greater.

$$\text{Ex: (i)} \frac{3}{5} > \frac{2}{5} \quad \text{(ii)} \frac{3}{7} < \frac{5}{7}$$

Try These

1. Which is the larger fraction? Why are these comparisons easy to make?

$$\text{Sol: (i)} \frac{7}{10} \text{ or } \frac{8}{10} \text{ Ans: } \frac{8}{10} \quad \text{(ii)} \frac{11}{24} \text{ or } \frac{13}{24} \text{ Ans: } \frac{13}{24} \quad \text{(iii)} \frac{17}{102} \text{ or } \frac{12}{102} \text{ Ans: } \frac{17}{102}$$

These are like fractions.

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

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

$$\text{Sol: Ascending order: } \frac{1}{8}, \frac{3}{8}, \frac{5}{8}$$

$$\text{Descending order: } \frac{5}{8}, \frac{3}{8}, \frac{1}{8}$$

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

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

$$\text{Sol: Ascending order: } \frac{1}{5}, \frac{3}{5}, \frac{4}{5}, \frac{7}{5}, \frac{11}{5}$$

$$\text{Descending order: } \frac{11}{5}, \frac{7}{5}, \frac{4}{5}, \frac{3}{5}, \frac{1}{5}$$

Sol: Ascending order: $\frac{1}{7}, \frac{3}{7}, \frac{7}{7}, \frac{11}{7}, \frac{13}{7}$.

Descending order: $\frac{13}{7}, \frac{11}{7}, \frac{7}{7}, \frac{3}{7}, \frac{1}{7}$.

Comparing unlike fractions

(i) If the numerator is the same in two fractions, the fraction with the smaller denominator is greater of the two'

Ex: (i) $\frac{3}{5} > \frac{3}{7}$ (ii) $\frac{4}{11} < \frac{4}{9}$

Try These

1. Arrange the following in ascending and descending order :

(a) $\frac{1}{12}, \frac{1}{2}, \frac{1}{5}, \frac{1}{7}, \frac{1}{50}, \frac{1}{9}, \frac{1}{17}$

Sol: Ascending order: $\frac{1}{50}, \frac{1}{17}, \frac{1}{12}, \frac{1}{9}, \frac{1}{7}, \frac{1}{5}, \frac{1}{2}$

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

Sol: Ascending order: $\frac{3}{17}, \frac{3}{13}, \frac{3}{11}, \frac{3}{7}, \frac{3}{5}, \frac{3}{4}, \frac{3}{2}$

(c) $\frac{5}{7}, \frac{5}{8}, \frac{5}{5}, \frac{5}{6}, \frac{5}{19}, \frac{5}{4}, \frac{5}{17}$

Sol: Ascending order: $\frac{5}{19}, \frac{5}{17}, \frac{5}{8}, \frac{5}{7}, \frac{5}{16}, \frac{5}{5}, \frac{5}{4}$

(d) $\frac{2}{7}, \frac{2}{11}, \frac{2}{5}, \frac{2}{3}, \frac{2}{13}, \frac{2}{15}, \frac{2}{17}$

Sol: Ascending order: $\frac{2}{17}, \frac{2}{15}, \frac{2}{13}, \frac{2}{11}, \frac{2}{7}, \frac{2}{5}, \frac{2}{3}$

When we compare two unlike fractions, we first get their equivalent fractions with a denominator which is a common multiple (prefer LCM) of the denominators of both the fractions.

Example 6 : Compare $\frac{4}{5}$ and $\frac{5}{6}$.

Sol: Common multiple of 5,6 = 30

$$\frac{4}{5} = \frac{4 \times 6}{5 \times 6} = \frac{24}{30} \quad ; \quad \frac{5}{6} = \frac{5 \times 5}{6 \times 5} = \frac{25}{30}$$

$$\frac{25}{30} > \frac{24}{30} \quad \text{so, } \frac{5}{6} > \frac{4}{5}$$

Example 7 : Compare $\frac{5}{6}$ and $\frac{13}{15}$.

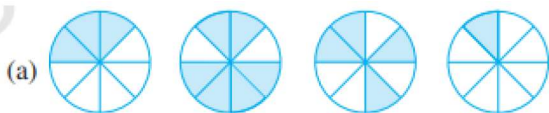
Sol: Common multiple of 6,15=30

$$\frac{5}{6} = \frac{5 \times 5}{6 \times 5} = \frac{25}{30}; \quad \frac{13}{15} = \frac{13 \times 2}{15 \times 2} = \frac{26}{30}$$

$$\frac{26}{30} > \frac{25}{30} \quad \text{So, } \frac{13}{15} > \frac{5}{6}$$

EXERCISE 7.4

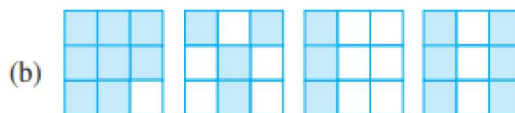
1. Write shaded portion as fraction. Arrange them in ascending and descending order using correct sign '<', '=', '>' between the fractions:



Sol: Fractions: $\frac{3}{8}, \frac{6}{8}, \frac{4}{8}, \frac{1}{8}$

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

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

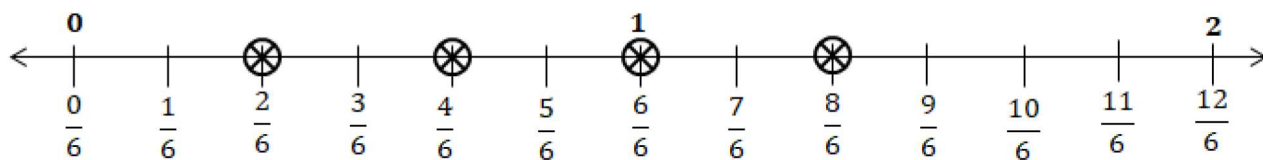


Sol: Fractions: $\frac{8}{9}, \frac{4}{9}, \frac{3}{9}, \frac{6}{9}$

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) 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



$$\frac{5}{6} > \frac{2}{6}, \quad \frac{3}{6} > 0, \quad \frac{1}{6} < \frac{6}{6}, \quad \frac{8}{6} > \frac{5}{6}$$

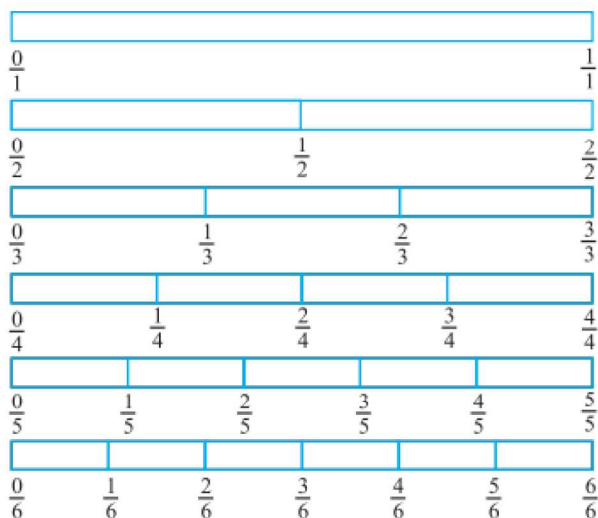
2. Compare the fractions and put an appropriate sign.

(a) $\frac{3}{6} < \frac{5}{6}$ (b) $\frac{1}{7} < \frac{1}{4}$ (c) $\frac{4}{5} < \frac{5}{5}$ (d) $\frac{3}{5} > \frac{3}{7}$

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

Sol:

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



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

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

* $\frac{a}{b}, \frac{x}{y}$ are two fractions (i) If $a \times y = b \times x$ then $\frac{a}{b} = \frac{x}{y}$

(ii) $a \times y > b \times x$ then $\frac{a}{b} > \frac{x}{y}$

(iii) $a \times y < b \times x$ then $\frac{a}{b} < \frac{x}{y}$

(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) $\frac{6}{10} = \frac{3}{5}$

(k) $\frac{5}{7} = \frac{15}{21}$

6. 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) $\frac{2}{12} = \frac{2 \div 2}{12 \div 2} = \frac{1}{6}$

(e) $\frac{10}{60} = \frac{10 \div 10}{60 \div 10} = \frac{1}{6}$

(i) $\frac{12}{75} = \frac{12 \div 3}{75 \div 3} = \frac{4}{25}$

(b) $\frac{3}{15} = \frac{3 \div 3}{15 \div 3} = \frac{1}{5}$

(f) $\frac{15}{75} = \frac{15 \div 15}{75 \div 15} = \frac{1}{5}$

(j) $\frac{12}{72} = \frac{12 \div 12}{72 \div 12} = \frac{1}{6}$

(c) $\frac{8}{50} = \frac{8 \div 2}{50 \div 2} = \frac{4}{25}$

(g) $\frac{12}{60} = \frac{12 \div 12}{60 \div 12} = \frac{1}{5}$

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

(d) $\frac{16}{100} = \frac{16 \div 4}{100 \div 4} = \frac{4}{25}$

(h) $\frac{16}{96} = \frac{16 \div 16}{96 \div 16} = \frac{1}{6}$

(l) $\frac{4}{25}$

Group 1: (a), (e), (h), (j), (k)

Group 2: (b), (f), (g)

Group 3: (c), (d), (i), (l)

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

Sol:

* $\frac{a}{b}, \frac{x}{y}$ are two fractions (i) If $a \times y = b \times x$ then $\frac{a}{b} = \frac{x}{y}$

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

Sol: $5 \times 9 = 45$ and $9 \times 4 = 36$ are not equal.

$$\text{So, } \frac{5}{9} \neq \frac{4}{9}$$

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

Sol: $9 \times 9 = 81$ and $16 \times 5 = 80$ are not equal.

$$\text{So, } \frac{9}{16} \neq \frac{5}{9}$$

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

Sol: $4 \times 20 = 80$ and $5 \times 16 = 80$ are equal.

$$\text{So, } \frac{4}{5} = \frac{16}{20}$$

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

Sol: $1 \times 30 = 30$ and $4 \times 15 = 60$ are not equal.

$$\text{So, } \frac{1}{15} \neq \frac{4}{30}$$

8. Ila read 25 pages of a book containing 100 pages. Lalita read $\frac{2}{5}$ of the same book. Who read less?

Sol: Total pages in book=100

Number of pages read by Ila=25

Ila read by $\frac{25}{100} = \frac{1}{4}$ of the book

Lalita read by $\frac{2}{5}$ of the book

We know that $\frac{1}{4} < \frac{2}{5}$. So, Ila read less than lalita.

9. 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: We know that $\frac{3}{4} > \frac{3}{6}$. So, Rohit exercised for a longer time.

10. In a class A of 25 students, 20 passed with 60% or more marks; in another class B of 30 students, 24 passed with 60% or more marks. In which class was a greater fraction of students getting with 60% or more marks?

Sol: Fraction of class A = $\frac{20}{25} = \frac{4}{5}$

Fraction of class B = $\frac{24}{30} = \frac{4}{5}$

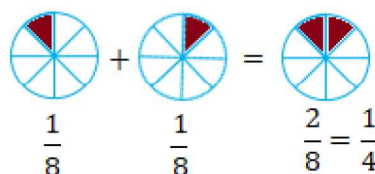
Two fractions are equal.

Addition and Subtraction of Fractions

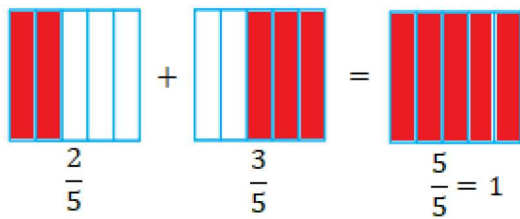
Try These

1. Add with the help of a diagram

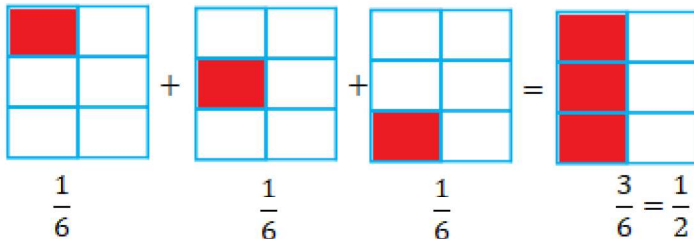
(i) $\frac{1}{8} + \frac{1}{8}$



(ii) $\frac{2}{5} + \frac{3}{5}$

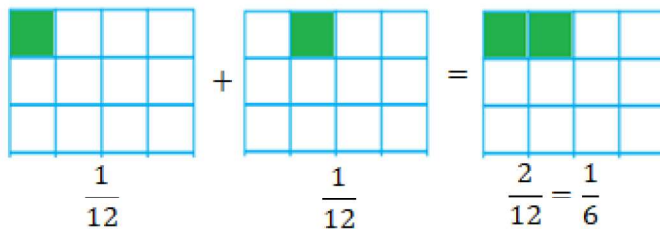


(iii) $\frac{1}{6} + \frac{1}{6} + \frac{1}{6}$



2. Add $\frac{1}{12} + \frac{1}{12}$. How will we show this pictorially? Using paper folding? (use grid paper)

Sol:



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

Adding or subtracting like fractions

(i) For adding two like fractions, the numerators are added and the denominator remains the same

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

(ii) For subtraction of two like fractions, the numerators are subtracted and the denominator remains the same

$$\frac{x}{a} - \frac{y}{a} = \frac{x-y}{a}$$

Try These

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

Sol: $\frac{7}{8} - \frac{3}{8} = \frac{7-3}{8} = \frac{4}{8}$

2. 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: Seema ate $= \frac{1}{5}$ and I ate $= \frac{1}{5}$

Total part eaten $= \frac{1}{5} + \frac{1}{5} = \frac{2}{5}$

The left part $= 1 - \frac{2}{5} = \frac{5}{5} - \frac{2}{5} = \frac{3}{5}$

3. **My elder sister divided the watermelon into 16 parts. I ate 7 out 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: I ate $= \frac{7}{16}$, My friend ate $= \frac{4}{16}$

We both eat $= \frac{7}{16} + \frac{4}{16} = \frac{11}{16}$


More I eat than my friend $= \frac{7}{16} - \frac{4}{16} = \frac{3}{16}$

Remaining portion $= 1 - \frac{11}{16} = \frac{16}{16} - \frac{11}{16} = \frac{5}{16}$

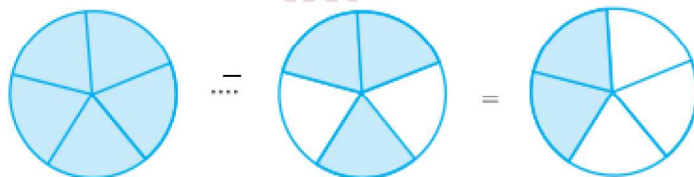
4. **Make five problems of this type and solve them with your friends.**

EXERCISE 7.5

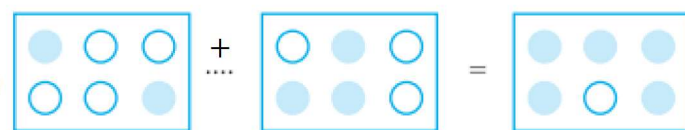
1. **Write these fractions appropriately as additions or subtractions :**

(a) 

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

(b) 

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

(c) 

Sol: $\frac{2}{6} + \frac{3}{6} = \frac{5}{6}$

2. **Solve :**

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

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

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

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

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

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

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

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

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

3. 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: Shubham painted = $\frac{2}{3}$

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

Total painted together = $\frac{2}{3} + \frac{1}{3} = \frac{3}{3} = 1$

So, they painted complete wall together

4. Fill in the missing fractions.

$$(a) \frac{7}{10} - \frac{4}{10} = \frac{3}{10} \quad (b) \frac{8}{21} - \frac{3}{21} = \frac{5}{21} \quad (c) 1 - \frac{3}{6} = \frac{3}{6} \quad (d) \frac{7}{27} + \frac{5}{27} = \frac{12}{27}$$

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

Sol: Fraction of oranges given = $\frac{5}{7}$

Fraction of oranges left = $1 - \frac{5}{7} = \frac{7}{7} - \frac{5}{7} = \frac{2}{7}$

Adding and subtracting unlike fractions:

For adding and subtracting unlike fractions first we convert in to like fractions and follow like fractions rule.

Example 8 : Subtract $\frac{3}{4}$ from $\frac{5}{6}$.

Sol: LCM of 4,6=12

$$\frac{5}{6} - \frac{3}{4} = \frac{5 \times 2}{6 \times 2} - \frac{3 \times 3}{4 \times 3} = \frac{10}{12} - \frac{9}{12} = \frac{10-9}{12} = \frac{1}{12}$$

Example 9 : Add $\frac{2}{5}$ to $\frac{1}{3}$

Sol: LCM of 5 and 3 =15

$$\frac{2}{5} + \frac{1}{3} = \frac{2 \times 3}{5 \times 3} + \frac{1 \times 5}{3 \times 5} = \frac{6}{15} + \frac{5}{15} = \frac{6+5}{15} = \frac{11}{15}$$

Example 10 : Simplify $\frac{3}{5} - \frac{7}{20}$

Sol: LCM of 5,20=20

$$\frac{3}{5} - \frac{7}{20} = \frac{3 \times 4}{5 \times 4} - \frac{7}{20} = \frac{12}{20} - \frac{7}{20} = \frac{12-7}{20} = \frac{5}{20} = \frac{1}{4}$$

Try These 

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

Sol: LCM of 5,7=35

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

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

Sol: LCM of 5,7=35

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

Example 11 : Add $2\frac{4}{5}$ and $3\frac{5}{6}$

Sol: LCM of 5,6=30

$$\frac{4}{5} + \frac{5}{6} = \frac{4 \times 6}{5 \times 6} + \frac{5 \times 5}{6 \times 5} = \frac{24}{30} + \frac{25}{30} = \frac{24+25}{30} = \frac{49}{30} = 1 + \frac{19}{30}$$

$$2\frac{4}{5} + 3\frac{5}{6} = 2 + 3 + \left(\frac{4}{5} + \frac{5}{6}\right) = 5 + 1 + \frac{19}{30} = 6 + \frac{19}{30} = 6\frac{19}{30}$$

Example 12 : Find $4\frac{2}{5} - 2\frac{1}{5}$.

Sol: $4\frac{2}{5} - 2\frac{1}{5} = (4-2) + \left(\frac{2}{5} - \frac{1}{5}\right) = 2 + \frac{1}{5} = 2\frac{1}{5}$

Example 13 : Simplify: $8\frac{1}{4} - 2\frac{5}{6}$

Sol: $8\frac{1}{4} - 2\frac{5}{6} = \frac{33}{4} - \frac{17}{6} = \frac{33 \times 3}{4 \times 3} - \frac{17 \times 2}{6 \times 2} = \frac{99}{12} - \frac{34}{12} = \frac{99-34}{12} = \frac{65}{12} = 5\frac{5}{12}$

EXERCISE 7.6

1. Solve

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

Sol: LCM of 3,7=21

$$\frac{2}{3} + \frac{1}{7} = \frac{2 \times 7}{3 \times 7} + \frac{1 \times 3}{7 \times 3} = \frac{14}{21} + \frac{3}{21} = \frac{14+3}{21} = \frac{17}{21}$$

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

Sol: LCM of 10,15=30

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

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

Sol: LCM of 9,7=63

$$\frac{4}{9} + \frac{2}{7} = \frac{4 \times 7}{9 \times 7} + \frac{2 \times 9}{7 \times 9} = \frac{28}{63} + \frac{18}{63} = \frac{28+18}{63} = \frac{46}{63}$$

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

Sol: LCM of 7,3=21

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

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

Sol: LCM of 5,6=30

$$\frac{2}{5} + \frac{1}{6} = \frac{2 \times 6}{5 \times 6} + \frac{1 \times 5}{6 \times 5} = \frac{12}{30} + \frac{5}{30} = \frac{17}{30}$$

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

Sol: LCM of 5,3=15

$$\frac{4}{5} + \frac{2}{3} = \frac{4 \times 3}{5 \times 3} + \frac{2 \times 5}{3 \times 5} = \frac{12}{15} + \frac{10}{15} = \frac{22}{15}$$

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

Sol: LCM of 4,3=12

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

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

Sol: LCM of 6,3=6

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

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

Sol: LCM of 3,4,2=12

$$\frac{2}{3} + \frac{3}{4} + \frac{1}{2} = \frac{2 \times 4}{12} + \frac{3 \times 3}{12} + \frac{1 \times 6}{12} = \frac{8}{12} + \frac{9}{12} + \frac{6}{12} = \frac{23}{12} = 1\frac{11}{12}$$

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

Sol: LCM of 2,3,6=6

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

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

$$\text{Sol: } \frac{1}{3} + \frac{2}{3} = \frac{3}{3} = 1$$

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

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

$$\text{Sol: } \frac{2}{3} + \frac{1}{4} = \frac{2 \times 4}{12} + \frac{1 \times 3}{12} = \frac{8}{12} + \frac{3}{12} = \frac{11}{12}$$

$$4\frac{2}{3} + 3\frac{1}{4} = 4 + 3 + \left(\frac{2}{3} + \frac{1}{4}\right) = 7 + \frac{11}{12} = 7\frac{11}{12}$$

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

$$\text{Sol: } \frac{16}{5} - \frac{7}{5} = \frac{9}{5}$$

$$(n) \frac{4}{3} - \frac{1}{2}$$

$$\text{Sol: } \frac{4}{3} - \frac{1}{2} = \frac{4 \times 2}{6} - \frac{1 \times 3}{6} = \frac{8}{6} - \frac{3}{6} = \frac{5}{6}$$

2. 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?

$$\text{Sol: Sarita} = \frac{2}{5} \text{ m}$$

$$\text{Lalita} = \frac{3}{4} \text{ m}$$

$$\text{Total length of the ribbon they bought} = \frac{2}{5} + \frac{3}{4}$$

$$= \frac{2 \times 4}{20} + \frac{3 \times 5}{20} = \frac{8}{20} + \frac{15}{20} = \frac{23}{20} \text{ m}$$

3. 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.

$$\text{Sol: Naina} = 1\frac{1}{2} \text{ piece of cake; Najma} = 1\frac{1}{3} \text{ piece of cake.}$$

$$\text{Total amount of cake given to both} = 1\frac{1}{2} + 1\frac{1}{3} = 1 + 1 + \left(\frac{1}{2} + \frac{1}{3}\right)$$

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

4. Fill in the boxes :

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

$$x - \frac{5}{8} = \frac{2}{8}$$

$$\frac{7}{8} - \frac{5}{8} = \frac{2}{8}$$

$$\text{Required fraction} = \frac{7}{8}$$

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

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

$$x - \frac{2}{10} = \frac{5}{10}$$

$$\frac{7}{10} - \frac{2}{10} = \frac{5}{10}$$

$$\text{Required fraction} = \frac{7}{10}$$

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

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

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

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

$$\text{Required fraction} = \frac{2}{6} = \frac{1}{3}$$

5. Complete the addition-subtraction box.

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

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

6. 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 wire = $\frac{7}{8}$ m

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

Length of other piece = $\frac{7}{8} - \frac{1}{4} = \frac{7}{8} - \frac{1 \times 2}{4 \times 2} = \frac{7}{8} - \frac{2}{8} = \frac{5}{8}$ m

7. 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 = $\frac{9}{10}$ km

Distance covered by bus = $\frac{1}{2}$ km

Distance walked by Nandini = $\frac{9}{10} - \frac{1}{2} = \frac{9}{10} - \frac{1 \times 5}{2 \times 5} = \frac{9}{10} - \frac{5}{10} = \frac{4}{10} = \frac{2}{5}$ km

8. 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: Fraction of books in Asha's shelf = $\frac{5}{6}$

Fraction of books in Samuel's shelf = $\frac{2}{5}$

We know that $\frac{5}{6} > \frac{2}{5}$

∴ Asha's bookshelf is more full.

$$\text{Fraction} = \frac{5}{6} - \frac{2}{5} = \frac{5 \times 5 - 6 \times 2}{30} = \frac{25 - 12}{30} = \frac{13}{30}$$

$$\begin{array}{l} \frac{5}{6} \searrow \nearrow \frac{2}{5} \\ 25 > 12 \\ \frac{5}{6} > \frac{2}{5} \end{array}$$

9. 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: Time taken by Jaidev = $2\frac{1}{5} = \frac{11}{5}$ minutes

Time taken by Rahul = $\frac{7}{4}$ minutes

we know that $\frac{11}{5} > \frac{7}{4}$

Rahul takes less time.

$$\text{Fraction} = \frac{11}{5} - \frac{7}{4} = \frac{11 \times 4 - 7 \times 5}{20} = \frac{44 - 35}{20} = \frac{9}{20}$$

Rahul takes $\frac{9}{20}$ minutes less than Jaidev

$$\begin{array}{l} \frac{11}{5} \searrow \nearrow \frac{7}{4} \\ 44 > 35 \\ \frac{11}{5} > \frac{7}{4} \end{array}$$

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