Mathematics

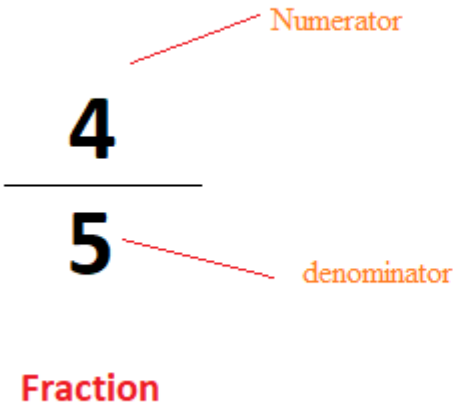
Chapter 7: Fractions

FRACTIONS

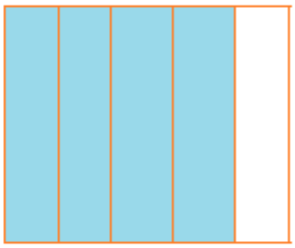
Fraction Definition

A fraction is a number representing a part of a whole. The whole may be a single object or a group of objects.

Suppose Ramesh has a chocolate and we want to equally share with his Friend Amit. He will divide the chocolate into two pieces and keep one piece with him and give another piece to Amit. So basically they each have got 1 part out of 2 parts i.e 1/2 of the chocolate. Similarly if they have another suresh also, then they will divide chocolate in three equal parts, then each of them will have 1 out of 3 parts i.e 1/3 of the chocolate



Fraction



4 parts out of 5 equal parts

Important Note:

When expressing a situation of counting parts to write a fraction, it must be ensured that all parts are equal.

Types of Fractions

Fractions are of three types.

a. Proper Fraction

b. Improper Fraction

c. Mixed Fraction.

proper Fraction:

Proper Fraction is the fraction which is less than 1 or where Numerator is less than Denominator

Here the Denominator shows the part whole has been divided and numerator shows the part which has been considered. This is the same fraction which we discussed with fraction definition

Example;

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

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

$$\frac{4}{3}$$

Improper Fraction: Improper Fraction is the fraction which is greater than 1 or where Numerator is greater than Denominator

Lets understand this with example. Suresh has 5 chocolates and he has to divide those chocolate among four friends. We can divide each chocolate into fours parts and each one can have one-quarter part of the each chocolate. So Each friend will be having 5 parts of the one-quarter part. Now 4 parts make one whole. So basically each one of them is getting 1 whole and 1 part. So this can be written as 5/4

Here numerator is more than denominator

Example:

$$\frac{11}{5}$$

$$\frac{5}{4}$$

$$\frac{10}{9}$$

Mixed Fraction:

It is combination of whole number and proper fraction

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

Lets the example of improper fraction only. The division can made in another way. We give one
chocolate to each of them and divide the fifth chocolate into four pieces. So each of them got

1 full chocolate and one-quarter part of last chocolate. So, this can written as

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

This is mixed fraction.

Also $1+\frac{1}{4}=1\ \frac{1}{4}=\frac{5}{4}$

Example:

$$\frac{2\frac{1}{5}}{1\frac{3}{4}}$$
$$1\frac{1}{9}$$

Convert Improper Fractions to Mixed Fraction

Step 1	Obtain the mixed fraction. Let the mixed fraction be $5^2/_6$
Step 2	Identify the whole number and the numerator (top) and denominator (bottom) of the proper fraction. Whole Number=5 Numerator=2 Denominator=6
Step 3	Apply the formula $\frac{(Whole\times Denominator)+Numerator}{Denominator}$ Example $5\frac{2}{6}$ $=\frac{32}{6}$

Example

$1\frac{1}{3}$

Apply the formula

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

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

How to convert Improper Fractions to Mixed Fraction

Step 1	Obtain the improper fraction.
Step 2	Divide the numerator by the denominator and obtain the quotient and remainder.
Step 3	Write the mixed fraction as $Quotient\ \frac{Reminder}{denominator}$

Example

$\frac{11}{3}$

Here Numerator is greater than denominator, So Improper fraction

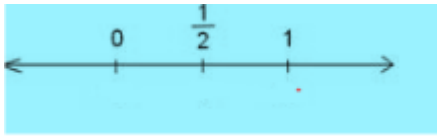
Now dividing 11 by 3, we get reminder as 2

So $\frac{11}{3} = 3\frac{2}{3}$

How to Represent Fraction on Number Line?

We can show fractions on a number line. In order to represent 1/2 on the number line, draw the number line and look for the portion between 0 and 1

Now, divide the gap between 0 and 1 into two equal parts. The point of division represents 1/2.

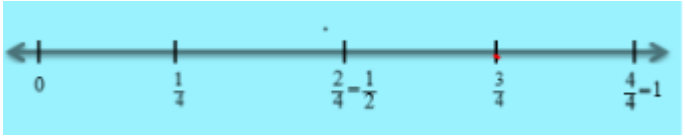


To represent 1/4 on a number line, we divide the gap between 0 and 1 into 4 equal parts

First point will represent ½

Second point will represent 2/4 =1/2

Third point will represent ¾



Simplest Form of a Fraction

If the numerator and the denominator of a fraction have no common factor except, then it is said to be in its simplest form or lowest form.

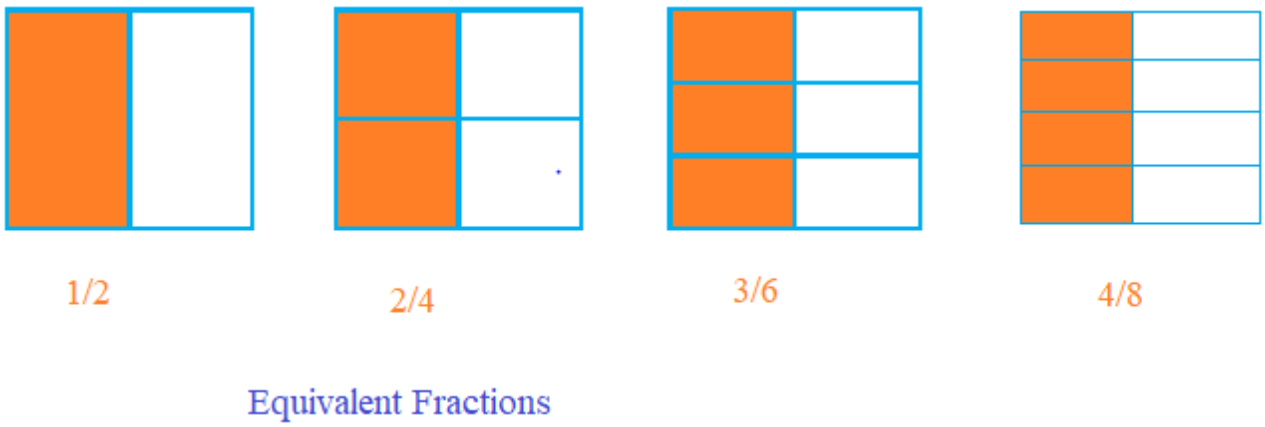
Example

$\frac{1}{3}$

$\frac{2}{3}$

Equivalent fractions

Equivalent fractions are fractions that have the same value in its simplest form.



Equivalent Fractions

Example

$\frac{2}{6}$, $\frac{1}{3}$, $\frac{6}{18}$ are equivalent fractions as they have same value

The equivalent fraction of a given fraction is obtained by multiplying both the numerator and the denominator of the given fraction by the same number.

Checkout Equivalent Fraction calculator

Example

$\frac{2}{3}$

Equivalent Fraction can be obtained by multiplying both the numerator and the denominator of the given fraction by the same number.

$$\frac{2}{3} = \frac{2\times3}{3\times3} = \frac{6}{9}$$
$$\frac{2}{3} = \frac{2\times5}{3\times5} = \frac{10}{15}$$
$$\frac{2}{3} = \frac{2\times7}{3\times7} = \frac{14}{21}$$

Like Fractions and Unlike Fractions

Like Fractions	Fractions with the same denominators are called like fractions. Example $\frac{1}{3}, \frac{2}{3}$ are Like Fractions $\frac{1}{4}, \frac{3}{4}$ are like Fractions
Unlike Fraction	Fractions with different denominators are called unlike fractions. Example $\frac{1}{3}, \frac{2}{5}$ are Unlike Fractions

Comparing Fractions

We often come across a situation where we need to compare fractions. There is systematic procedure available for Comparing Fractions. It is divided into two Comparing Like Fraction which is easy and other is Comparing unlike Fraction. lets take a deep dive into it

Comparing Like Fraction

The numerator value decides the larger value.

$$\frac{5}{6} > \frac{2}{6}$$
$$\frac{3}{6} > 0$$
$$\frac{1}{6} < \frac{6}{6}$$
$$\frac{8}{6} < \frac{5}{6}$$
So, $\frac{1}{10} < \frac{2}{10} < \frac{3}{10} < \frac{4}{10}$

Comparing Unlike Fraction

We can further divide into two parts.

Comparing fractions with same numerator

For fractions having same numerator, the fraction with the lowest denominator is the greater

number

Example

2/5 and 2/7

Here 5 < 7

So 2/5 > 2/7

Comparing fractions with different denominator and numerator

Here we would be using the technique of equivalent fractions. We would convert each of the fraction into equivalent fraction such that they become like fractions. Then comparison is simple. So here are the steps

1. Find the LCM of the denominators

2. Convert each fraction into equivalent fraction such that denominator is the LCM.

3. Now both the fraction are converted into Like fraction, so we can do the comparison easily

Example

1)Compare $\frac{2}{3}$ and $\frac{2}{7}$

Solution

LCM of denominator is 3 and 7 is 21

So converting them equivalent Like fractions

$\frac{2}{3} = \frac{2\times7}{3\times7} = \frac{14}{21}$

$\frac{5}{7} = \frac{5\times3}{7\times3} = \frac{15}{21}$

Now $\frac{15}{21} > \frac{14}{21}$

So $\frac{5}{7} > \frac{2}{3}$

2)Compare $\frac{5}{6}$ and $\frac{13}{15}$

Solution

LCM of denominator is 6 and 15 is 30

So converting them equivalent Like fractions

$\frac{5}{6} = \frac{5\times5}{6\times5} = \frac{25}{30}$

$\frac{13}{15} = \frac{13\times2}{15\times2} = \frac{26}{30}$

Now $\frac{26}{30} > \frac{25}{30}$

So $\frac{13}{15} > \frac{5}{6}$

How to Add Fractions

We often come across a situation where we need to add fractions. There is systematic procedure available for adding Fractions. It is divided into two parts Adding Like Fraction which is easy and other is Adding unlike Fraction. lets take a deep dive into it.

Adding Like Fraction

Addition: The numerator adds to provide the final fraction value.

$$\frac{1}{5}+\frac{1}{5}=\frac{2}{5}$$
$$\frac{1}{6}+\frac{4}{6}=\frac{5}{6}$$
$$\frac{9}{11}+\frac{1}{11}=\frac{10}{11}$$

Adding Unlike Fraction

First, we need to convert the unlike fraction to like fraction using the LCM of the denominators and convert each fraction into like fraction using the LCM

And then it works like “like” Fraction

Let us check few examples to make it clear

Example

Perform the below Addition

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

Solution

LCM of 2 and 3 is 6

So converting them into equivalent Like Fractions

$$\frac{1}{2}=\frac{1\times3}{2\times3}=\frac{3}{6}$$
$$\frac{1}{3}=\frac{1\times2}{3\times2}=\frac{2}{6}$$

So

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

How to Subtract Fractions

We often come across a situation where we need to subtract fractions. There is systematic procedure available for subtract Fractions. It is divided into two parts Subtracting Like Fraction which is easy and other is Subtracting unlike Fraction. lets take a deep dive into it

Subtracting Like Fraction

Subtraction: The Numerator subtract to provide the final fraction value.

$$\frac{4}{5} - \frac{1}{5} = \frac{3}{5}$$
$$\frac{5}{6} - \frac{4}{6} = \frac{1}{6}$$
$$\frac{9}{11} - \frac{1}{11} = \frac{8}{11}$$

Subtracting UnLike Fraction

First we need to convert the unlike fraction to like fraction using the LCM of the denominators and convert each fraction into like fraction using the LCM

And then it works like “like” Fraction

Let us check few example to make it clear

Example

Perform the below Subtraction

$\frac{1}{2} - \frac{1}{3}$ Solution

LCM of 2 and 3 is 6

So converting them into equivalent Like Fractions

$$\frac{1}{2} = \frac{1\times3}{2\times3} = \frac{3}{6}$$
$$\frac{1}{3} = \frac{1\times2}{3\times2} = \frac{2}{6}$$

So

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

Comparison, Addition and Subtraction of Mixed Fractions

Two mixed fractions can be added or subtracted by adding or subtracting the whole number of the two fractions and then adding or subtracting the fractional parts together.

Two mixed fractions can also be converted into improper fractions and then added or subtracted.

Example

1)Perform the below Addition

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

Solution

First way

We add the whole number and add the fractional part

$1\frac{1}{2}+2\frac{1}{3}$ $=1+2+\frac{1}{2}+\frac{1}{3}$ $=3+\frac{1}{2}+\frac{1}{3}$ Now LCM of 2 and 3 is 6

So converting them into equivalent Like Fractions

$\frac{1}{2}=\frac{1\times3}{2\times3}=\frac{3}{6}$

$\frac{1}{3}=\frac{1\times2}{3\times2}=\frac{2}{6}$

So

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

Second way

We convert them into improper fraction

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

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

Now LCM of 2 and 3 is 6

So converting them into equivalent Like Fractions

$\frac{3}{2}=\frac{3\times3}{2\times3}=\frac{9}{6}$

$\frac{7}{3}=\frac{7\times2}{3\times2}=\frac{14}{6}$

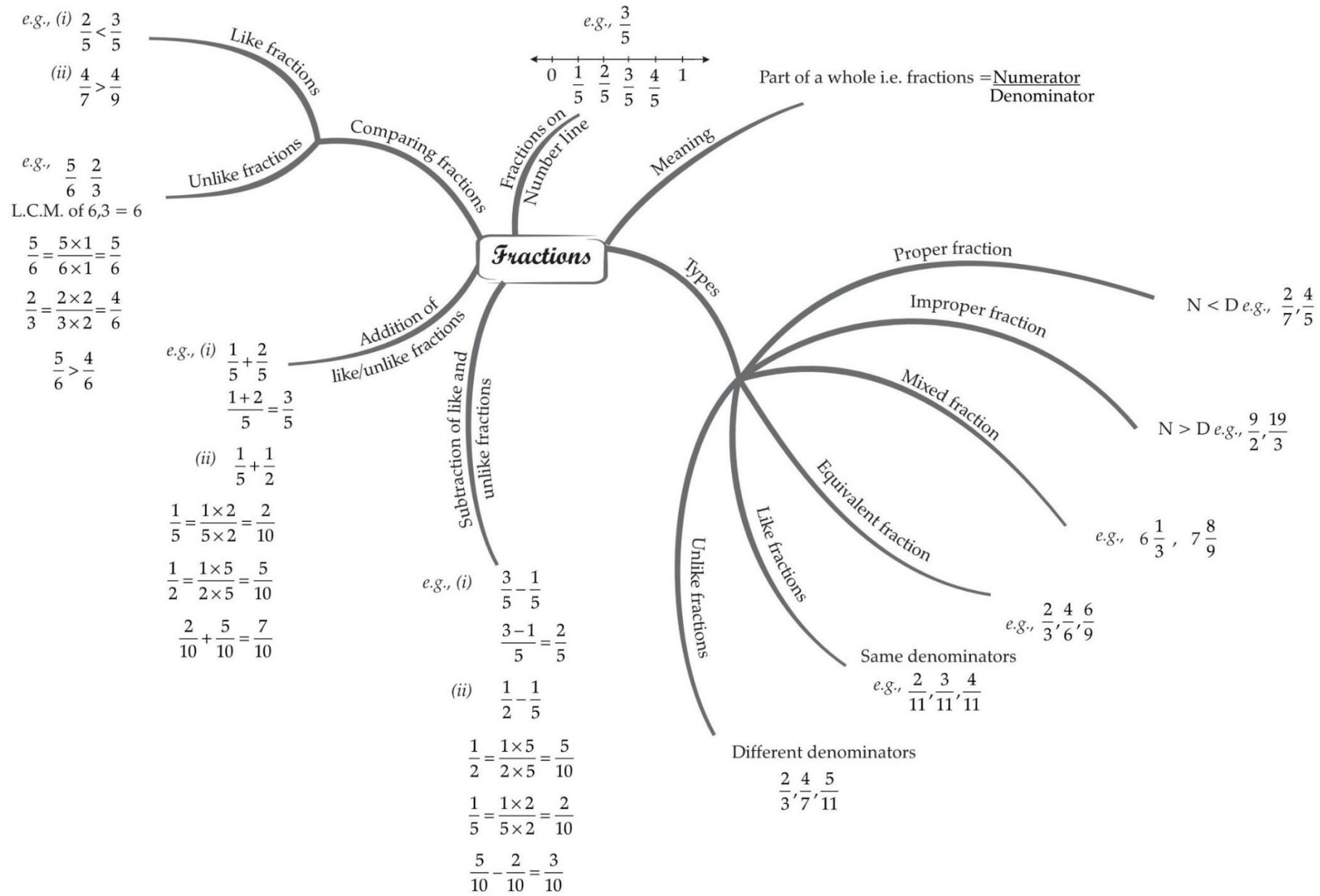
So

$=\frac{9}{6}+\frac{14}{6}$

$=\frac{23}{6}=3\frac{5}{6}$

MIND MAP : LEARNING MADE SIMPLE

CHAPTER-7



Important Questions

Multiple Choice questions:

Question 1. $\frac{2}{5}+\frac{3}{10}+\frac{11}{20}$ is equal to:

(a) $\frac{25}{20}$
(b) $\frac{24}{20}$
(c) $\frac{28}{20}$
(d) $\frac{19}{20}$

Question 2. Which of these makes a whole?

(a) One half

(b) Two halves

(c) 3 halves

(d) 5 halves

Question 3. Give a proper fraction whose numerator is 5 and denominator is 7.

(a) $\frac{7}{5}$
(b) $\frac{5}{7}$
(c) $\frac{3}{7}$
(d) None of these

Question 4. Mixed fraction $2\frac{3}{19}$ as improper fraction is:

(a) $\frac{40}{19}$
(b) $\frac{41}{19}$
(c) $\frac{42}{19}$
(d) none of these

Question 5. What is the simplified form of the product and $\frac{12}{24}$ and $\frac{36}{72}$

(a) $\frac{16}{24}$
(b) $\frac{3}{5}$
(c) 4
(d) $\frac{1}{4}$

Question 6. The identity $(x + 3)(x + 4) = x^2 + 7x + 12$ is true for

(a) Two values of x

(b) One value of x

(c) All value of x

(d) None of Above

Question 7. What do you call fractions with different denominators?

(a) Like fractions

(b) Unlike fractions

(c) Proper fractions

(d) Improper fractions

Question 8. If the numerator and denominator of a fraction are equal then the fraction is:

(a) less than 1

(b) equal to 1

(c) greater than 1

(d) none of these

Question 9. Mixed fraction of $\frac{17}{9}$ is:

(a) $1\frac{7}{9}$
(b) $1\frac{5}{9}$
(c) $1\frac{3}{9}$
(d) none of these

Question 10. A fraction with numerator 1 is called:

(a) like fraction

(b) proper fraction

(c) unit fraction

(d) mixed fraction

Question 11. A two-digit number is such that the product of the digits is 8. When 18 is added to the number, then the digits are reversed. The number is:

(a) 18

(b) 24

(c) 42

(d) 81

Question 12. A _____ is a number representing part of a whole.

(a) Decimal

(b) Proper fraction

(c) Fraction

(d) None of these

Question 13. By how much is $\frac{19}{20}$ greater than $\frac{2}{20}$?

(a) $\frac{21}{20}$
(b) $\frac{21}{40}$
(c) $\frac{17}{20}$
(d) $\frac{17}{40}$

Question 14. What is the fractional form of five eighteenths?

(a) $\frac{15}{18}$
(b) $\frac{18}{5}$
(c) $\frac{5}{18}$
(d) 5.18

Question 15. What fraction of an hour is 40 minutes?

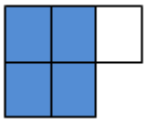
(a) 1

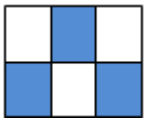
(b) $\frac{1}{3}$

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

(d) None of these

Match The Following:

	Column I		Column II
1.		**A.**	$\frac{5}{9}$
2.		**B.**	$\frac{1}{2}$

	Column I		Column II
3.		**C.**	$\frac{1}{3}$
4.		**D.**	$\frac{4}{5}$

Fill in the blanks:

There is a large box of 36 small square boxes.

1. $\frac{1}{2}$ of it is _____.
2. $\frac{2}{3}$ of it is _____.
3. If I make a bench of 20 small boxes, the fraction becomes _____.
4. _____ boxes are required if fraction is $\frac{5}{6}$.

True /False:

1. If a and b are any two integers such that a > b, then -a > – b.
2. In $\frac{3}{7}$, 3 is the part of whole.
3. On a number line, $\frac{2}{7}$ is to the right of zero.
4. $\frac{2}{5}$ is smaller than $\frac{1}{5}$.
5. $\frac{28}{45}$ and $\frac{3}{5}$ represent equivalent fractions.

Very Short Questions:

1. Solve: $\frac{16}{5} - \frac{7}{5}$
2. Colour the part according to $\frac{3}{4}$.
3. Find the equivalent fraction $\frac{3}{5}$ having numerator $\frac{2}{7}$.

4. Rewrite the fractions in the simplest form

(a) $\frac{8}{6}$

(b) $\frac{44}{72}$

5. Express the following as mixed fraction: $\frac{19}{6}$

6. Show $\frac{10}{10}$ on the number line.

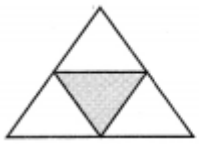
7. Find the missing entries in the tables:

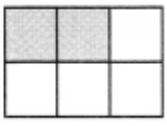
Fraction in standard form	Numerator	Denominator	Diagrammatic Representation
$\frac{6}{7}$	84	a	
b	5	6	
$\frac{9 \times 2}{5 \times 2}$	c	10	

8. Represent the following fractions on number line.

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

9. Write the fractions showing the shaded portions:

(a) 

(b) 

10. Write all the natural numbers from 1 to 15. What fraction of them are prime numbers?

Short Questions:

1. Write the following fractions in ascending order:

$\frac{2}{3}, \frac{2}{7}, \frac{2}{11}, \frac{2}{5}$ and $\frac{2}{9}$

2. Write any

(a) three proper and three improper fractions with denominator 7.

(b) two proper and two improper fractions with numerator 9.

3. Compare the following fractions:

$(a)\ \frac{4}{5}$ and $\frac{5}{6}$ $(b)\ \frac{3}{4}$ and $\frac{2}{5}$

4. Find the sum of $1\frac{2}{3}$ and $3\frac{2}{5}$.

5. Subtract $2\frac{3}{4}$ from $4\frac{1}{8}$.

6. Insert > or < to make each of the following true.

$(a)\ \frac{6}{7} \square \frac{5}{7}$ $(b)\ \frac{10}{21} \square \frac{10}{12}$ $(c)\ \frac{3}{7} \square \frac{3}{8}$

Long Questions:

1. Find the difference between the greatest and the smallest fractions.

$3\frac{3}{5}, 2\frac{4}{7}, \frac{19}{6}, \frac{18}{8}$

2. 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?

Assertion and Reason Questions:

1.) Assertion (A) – 3/7 is obtained when we divide a whole into seven equal parts and take three parts

Reason (R) – a fraction is a number representing part of a whole.

a) Both A and R are true and R is the correct explanation of A

b) Both A and R are true but R is not the correct explanation of A

c) A is true but R is false

d) A is false but R is true

2.) Assertion (A) – 5/2 is obtained when we divide a whole into five equal parts and three parts

Reason (R) – a fraction is a number representing part of a whole.

a) Both A and R are true and R is the correct explanation of A

b) Both A and R are true but R is not the correct explanation of A

c) A is true but R is false

d) A is false but R is true

ANSWER KEY -

Multiple Choice questions:

1. (a) $\frac{25}{20}$
2. (b) Two halves
3. (b) $\frac{5}{7}$
4. (b) $\frac{41}{49}$
5. (d) $\frac{1}{4}$
6. (c) All value of x
7. (b) Unlike fractions
8. (b) equal to 1
9. (c) $1\frac{3}{9}$
10. (c) unit fraction
11. (b) 24

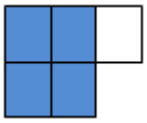
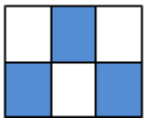
12. (c) Fraction

13. (c) $\frac{17}{20}$

14. (c) $\frac{5}{18}$

15. (c) $\frac{2}{3}$

Match The Following:

	Column I		Column II
1.		**D.**	$\frac{4}{5}$
2.		**A.**	$\frac{5}{9}$
3.		**B.**	$\frac{1}{2}$
4.		**C.**	$\frac{1}{3}$

Fill in the blanks:

1. $\frac{1}{2}$ of it is **18**.

2. $\frac{2}{3}$ of it is **24**.

3. If I make a bench of 20 small boxes, the fraction becomes $\frac{5}{9}$.

4. **30** boxes are required if fraction is $\frac{5}{6}$.

True /False:

1. True

2. True

3. False

4. False

Very Short Answer:

1. $\frac{16}{5} - \frac{7}{5} = \frac{16-7}{5} = \frac{9}{5} = 1\frac{4}{5}$

2. $\frac{3}{4}$ means 3 parts out of 4 parts.

So, colour 3 parts out of 4 parts given. 

3. $\frac{3}{5} = \frac{3\times9}{5\times9} = \frac{27}{45}$

4. $(a)\ \frac{8}{6} = \frac{8\div2}{6\div2} = \frac{4}{3}$

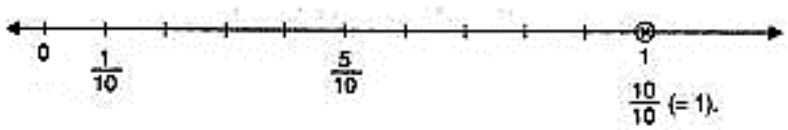
$(b)\ \frac{44}{72} = \frac{44\div2}{72\div2} = \frac{22\div2}{36\div2} = \frac{11}{18}$

5. $\frac{19}{6} = 9 \div 6$

$$
\begin{array}{r}
6\overline{)19}\,(3 \\
\underline{18} \\
1
\end{array}
$$

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

6. $\frac{10}{10}$ is 1 whole, which can be shown by the point 1.



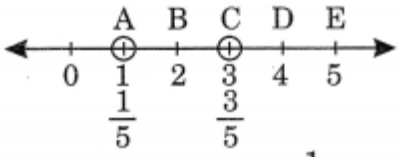
7.

Fraction in standard form	Numerator	Denominator	Diagrammatic Representation
$\frac{6}{7}\ \frac{6}{7}$	84	98 98	
$\frac{5}{6}\ \frac{5}{6}$	5	6	
$\frac{9}{5} = 1\frac{4}{5}\ \frac{9}{5} = 1\frac{4}{5}$	18 18	10	

a. $\frac{6}{7}\ \frac{6}{7} = \frac{6\times14}{7\times14} = \frac{84}{98}\ \frac{6\times14}{7\times14} = \frac{84}{98}$ b. $\frac{5}{6} = \frac{5\times1}{6\times1} = \frac{5}{6}\ \frac{5}{6} = \frac{5\times1}{6\times1} = \frac{5}{6}$ c.

$\frac{9}{5} = \frac{9\times2}{5\times2} = \frac{18}{10}\ \frac{9}{5} = \frac{9\times2}{5\times2} = \frac{18}{10}$

8.



Point A represents $\frac{1}{5}$

Point C represents $\frac{3}{5}$

9. (a) Shaded portion represents $\frac{1}{4}$

(b) Shaded portion represents $\frac{2}{6}$

10. 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.

∴ Fraction of prime numbers = $\frac{6}{15}$

Short Answer:

1. Here, the numerators of all the fractions are same

∴ Ascending order is $\frac{2}{11}, \frac{2}{9}, \frac{2}{7}, \frac{2}{5}, \frac{2}{3}$

2. (a) Proper fractions with denominator 7 are: $\frac{2}{7}$, $\frac{3}{7}$ and $\frac{5}{7}$

Improper fractions with denominator 7 are: $\frac{9}{7}$, $\frac{11}{7}$ and $\frac{13}{6}$

(b) Proper fractions with numerator 9 are: $\frac{9}{11}$ and $\frac{9}{17}$

Improper fractions with numerator 9 are: $\frac{9}{2}$ and $\frac{9}{15}$

3.

(a) $\frac{4}{5}$ and $\frac{5}{6}$

LCM of 5 and 6 = 30

$\therefore \quad \frac{4}{5} = \frac{4\times6}{5\times6} = \frac{24}{30}$

and $\quad \frac{5}{6} = \frac{5\times5}{6\times5} = \frac{25}{30}$

Here, $\quad 24 < 25 \Rightarrow \frac{24}{30} < \frac{25}{30}$

$\therefore \quad \frac{4}{5} < \frac{5}{6}$

(b) $\frac{3}{4}$ and $\frac{2}{5}$

LCM of 4 and 5 = 20

$\therefore \quad \frac{3}{4} = \frac{3\times5}{4\times5} = \frac{15}{20}$

and $\quad \frac{2}{5} = \frac{2\times4}{5\times4} = \frac{8}{20}$

Here, $\quad 15 > 8 \Rightarrow \frac{15}{20} > \frac{8}{20}$

$\therefore \quad \frac{3}{4} > \frac{2}{5}$

4.

$$= 4+\left(\frac{2\times5}{3\times5}+\frac{2\times3}{5\times3}\right) = 4+\left(\frac{10}{15}+\frac{6}{15}\right)$$

$$= 4+\frac{(10+6)}{15} = 4+\frac{16}{15} = 4+1+\frac{1}{15}$$

$$= 5+\frac{1}{15} = 5\frac{1}{15}$$

Hence, $1\frac{2}{3}+3\frac{2}{5} = 5\frac{1}{15}$

5.

$$4\frac{1}{8}-2\frac{3}{4}=\frac{(4\times8)+1}{8}-\frac{(2\times4)+3}{4}=\frac{32+1}{8}-\frac{8+3}{4}$$

$$=\frac{33}{8}-\frac{11}{4}$$

LCM of 8 and 4 is 8

$$\therefore \quad \frac{33\times1}{8\times1}-\frac{11\times2}{4\times2}=\frac{33}{8}-\frac{22}{8}$$

$$=\frac{33-22}{8}=\frac{11}{8}=1\frac{3}{8}$$

Hence, $4\frac{1}{8}-2\frac{3}{4}=1\frac{3}{8}$

6.

(a) $\frac{6}{7} \square \frac{5}{7}$

Here, denominators are same, i.e., 7 and $6 > 5$

$\therefore \quad \frac{6}{7} \boxed{>} \frac{5}{7}$

(b) $\frac{10}{21} \square \frac{10}{12}$

Here, numerators are same, i.e., 10 and $21 > 12$

$\therefore \quad \frac{10}{21} \boxed{<} \frac{10}{12}$

(c) $\frac{3}{7} \square \frac{3}{8}$

Here, numerators are same, i.e., 3 and $7 < 8$

$\therefore \quad \frac{3}{7} \boxed{>} \frac{3}{8}$

Long Answer:

1.

We have $3\frac{3}{5}, 2\frac{4}{7}, \frac{19}{6}, \frac{18}{8}$

$$3\frac{3}{5} = \frac{(3\times5)+3}{5} = \frac{15+3}{5} = \frac{18}{5}$$

$$2\frac{4}{7} = \frac{(2\times7)+4}{7} = \frac{14+4}{7} = \frac{18}{7}$$

Improper form of all the fractions are

$\frac{18}{5}, \frac{18}{7}, \frac{19}{6}$ and $\frac{18}{8}$

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

LCM $= 2 \times 2 \times 2 \times 3 \times 5 \times 7 = 840$

LCM of 5, 7, 6 and 8 = 840

Making the denominators same, we have

$$\frac{18}{5} = \frac{18\times168}{5\times168} = \frac{3024}{840} \quad [\because\ 840 \div 5 = 168]$$

$$\frac{18}{7} = \frac{18\times120}{7\times120} = \frac{2160}{840} \quad [\because\ 840 \div 7 = 120]$$

$$\frac{19}{6} = \frac{19\times140}{6\times140} = \frac{2660}{840} \quad [\because\ 840 \div 6 = 140]$$

$$\frac{18}{8} = \frac{18\times105}{5\times105} = \frac{1890}{840} \quad [\because\ 840 \div 8 = 105]$$

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

$$= \frac{18}{5} - \frac{18}{8} = \frac{18\times8}{5\times8} - \frac{18\times5}{8\times5} = \frac{144}{40} - \frac{90}{40}$$

$$= \frac{54}{40} = \frac{27}{20}$$

Hence the required difference = $\frac{27}{20}$ or $1\frac{7}{20}$

2. Space of the wall painted by Simran = $\frac{2}{3}$

Space of the wall painted by Rahul = $\frac{1}{5}$

Total space painted by both = $\frac{2}{3}+\frac{1}{5}$

$$= \frac{2\times5}{3\times5}+\frac{1\times3}{5\times3} = \frac{10}{15}+\frac{3}{15} = \frac{10+3}{15} = \frac{13}{15}$$

Unpainted space of the wall = $1-\frac{13}{15}$

$$= \frac{1}{1}-\frac{13}{15} = \frac{1\times15}{1\times15}-\frac{13\times1}{15\times1}$$

$$= \frac{15}{15}-\frac{13}{15} = \frac{15-13}{15} = \frac{2}{15}$$

Hence $\frac{2}{15}$ th of the wall space is unpainted.

Assertion and Reason Answers:

1) a) Both A and R are true and R is the correct explanation of A
2) d) A is false but R is true