

CDT Materials(2018-19)

Class – V

Mathematics



1. Number System: The ways of representation of numbers using digits or other symbols in a consistent manner.

Types of numbers:-

1. **Natural Numbers-** Counting numbers 1,2,3,4,5 are called natural numbers. e.g.,
1,2,3,4,5,6,.....

2. **Whole Numbers-** All counting numbers together with zero form the set of whole numbers.

(i) 0 is the only whole number which is not a natural number.

(ii) Every natural number is a whole number.

3. **Integers-** All natural numbers, 0 and negatives of counting numbers. e.g., 0,-1,-2,-3,1,2,3.....

4. **Even Numbers-** A number divisible by 2 is called an even number, e.g., 2,4,6,8,14, 52 etc.

5. **Odd Numbers-** A number not divisible by 2 is called an odd number. e.g., 1,3,5,7,9,11, etc.

6. **Prime Numbers-** A number greater than 1 is called a prime number, if it has exactly two factors, namely 1 and the number itself. e.g., 3, 11, 7.....

7. **Composite Numbers-** Numbers greater than 1 which are not prime, are known as composite numbers, e.g. 9,10,12, 15, 36 etc.

(i) 1 is neither prime nor composite.

(ii) 2 is the only even number which is prime.

(iii) There are 25 prime numbers between 1 and 100.

8. **Even, Odd Numbers**

A number is even if the remainder is zero when the number is divided by 2.

A number is odd if the remainder is one when the number is divided by 2.



Place Value and Face Value

Place Value- Place value of a digit in a number is the digit multiplied by its position in the place value chart. It depends upon a digit's position in the number. As the digit moves on to the left, its value increases.

Lakhs Period		Thousands Period		Ones Period		
Ten Lakhs	Lakhs	Ten Thousand	Thousands	Hundreds	Tens	Ones
6	4	5	7	2	8	3

The place value chart has been separated into three groups: The ones period has three places- Hundreds, tens, and ones. The thousands period has two places- Ten thousands and thousands. The next period is the lakh period which includes- Ten lakhs and lakhs.

Use of Commas

If we write the number without using the place value charts, we use comma(,) to separate the periods.

Let us take an example: 64,57,283

First comma is used when the ones period is complete. Second comma is used when thousands period is complete. Next comma is used to separate thousands and lakhs period.

Face Value-

Face value of a digit in a number is the digit itself, irrespective of the position of the digit in the number.

In the number 9843

Face value of 9 = 9

Face value of 8 = 8

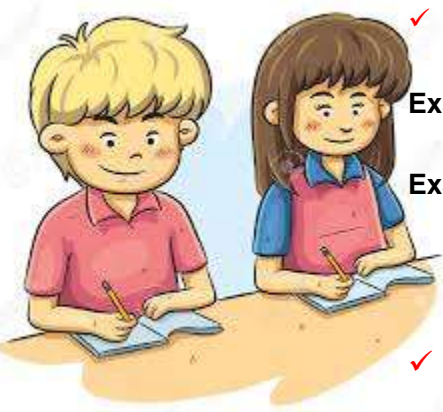
Face value of 4 = 4

Face value of 3 = 3

Remember

- 1. The face value of a digit in any number is the digit itself.*
- 2. The place value and face value of a digit in the ones place are always equal.*
- 3. The place value and face value of zero in any number is always zero.*

2.Computation Operations : Addition, Subtraction, Multiplication and Division are most ancient mathematical tools. The fundamental day to day activities are the combination of these four basic mathematics. We must have expertise over the hidden application of these mathematical operations.



✓ **Problems containing addition, subtraction or both.**

Example 1: Add the subtraction of 516 and 132 with 945.

Example 2: There were 512 apples in a stock. One more stock of 452 apples was brought and added to first. In total 65 apples were found not worth to sell so thrown away. How many apples can the stockiest sell ?

✓ **Problems containing multiplication, division and unitary method.**

Example: 1. Words on 25 pages = 825 ; words on 1 page = _____

Example:2. Cost of 16 tickets is Rs. 672. How much will it cost for 9 tickets?

a) Measurement

1. Length

The standard unit for measuring length is a meter. One-meter equals roughly one long step of an adult man. One kilometer equals about 12 minute's walk.



Length of cloth, the height of a wall, the height of a tree, the distance between two objects are all measured on meters. Carpenters use measuring tape for making furniture. Cloth merchant uses a meter rod for measuring length of clothes.

Remember

1 Kilometer = 1000 meter

1 Meter = 100 Centimeter

1 Centimeter = 10 millimeter

Short cut to problem solving for length

- ✓ Always start from 0 while using measuring instruments.
- ✓ Millimeter (mm) and centimeter (cm) are used to measure the small objects.
- ✓ Meter (m) and Kilometer (km) are used to measure large distance.
- ✓ Always convert the length of given objects in to same unit of length before solving them.

2. Weight

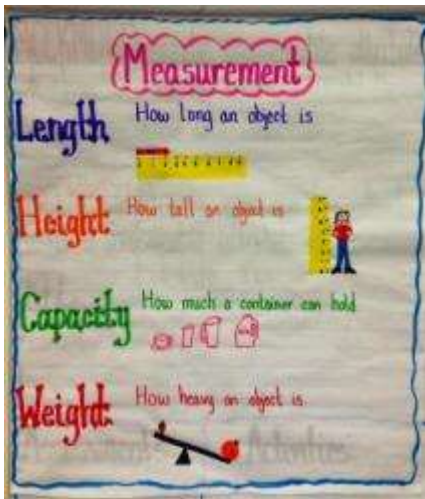
The standard unit for measuring mass or weight is a kilogram. We weigh things in kilograms. Lighter objects and smaller quantities of things are weighed in grams. We write Kilogram as kg and gram as gm. We commonly see cast iron weights in vegetable shop used to measure weight of vegetables.

Points to Remember

- ✓ Always start from 0 while using weighing balance.
- ✓ Gram (gm) is used to weigh lighter objects.
- ✓ Kilogram (kg) is used to measure heavier objects.
- ✓ Always convert the weight of given objects in to same unit of weight before adding or subtracting them.

$$1 \text{ kg} = 1000 \text{ gm}$$

Different units of measurement for measurement



Items	Units of measurement	Items	Units of measurement
Height of desk	m or cm	Distance between two cities	km
Height of Building	Meter	Height of coconut tree	Meter
Length of saree	Meter	Height of water bottle	cm
Vegetables	kg or gm	Length of sewing needle	cm

b) Money- Currency is the foundation of national economics.

Conversion of Rupees into Paise:

- ✓ We know that 1 rupee = 100 paise. When we convert rupees into paise, we multiply by 100.



For example, Rs 7.75 = Rs 7 + 75 paise
 $= 7 \times 100 \text{ paise} + 75 \text{ paise}$
 $= 700 \text{ paise} + 75 \text{ paise}$
 $= 775 \text{ paise}$



Conversion of Paise into Rupees :

- ✓ To convert paise into rupees first we need to count two digits from the right and put a point and also write Rs or Re in the beginning.

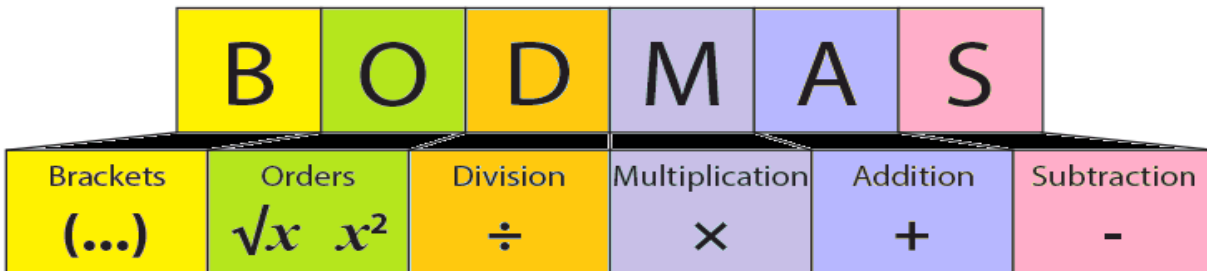
Examples : (i) 1450 p = Rs 14.50

(ii) 4155 p = Rs 41.55

(iii) 1 p = Rs 0.01



c) BODMAS

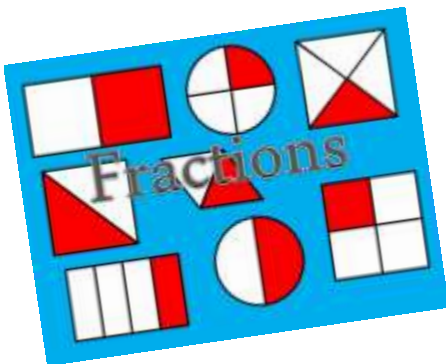


(a) $(3 + 2) \times 6 - 8$ (brackets first)
 $= 5 \times 6 - 8$ (multiplication second)
 $= 30 - 8$ (subtraction last)
 $= 22$

(b) $4 \times 6 + 18 \div 2$ (multiplication and division must be done before addition)
 $= 24 + 9$
 $= 33$

(c) $(17 - 2) \div 5 + 6$ (brackets first)
 $= 15 \div 5 + 6$ (division second)
 $= 3 + 6$ (addition last)
 $= 9$

RULES FOR INTEGERS (SIGNED NUMBERS)	
ADDITION	SUBTRACTION
$+$ and $+$ = $+$	ADD THE OPPOSITE!
$-$ and $-$ = $-$	(Change the subtraction sign to an addition sign.
$+$ and $-$ = $+$	Change the sign of the second number.
$+$ and $-$ = $-$	Now follow the Addition rules!)
MULTIPLICATION AND DIVISION	
$+$ and $+$ = $+$	$+$ and $-$ = $-$
$-$ and $-$ = $+$	$-$ and $+$ = $-$



3. Fractions- A Fraction is a part of a whole. The whole can be a region or a collection. A region is a whole when there is only one Object. For example, a cake represents a whole and a slice of it represents a fraction.



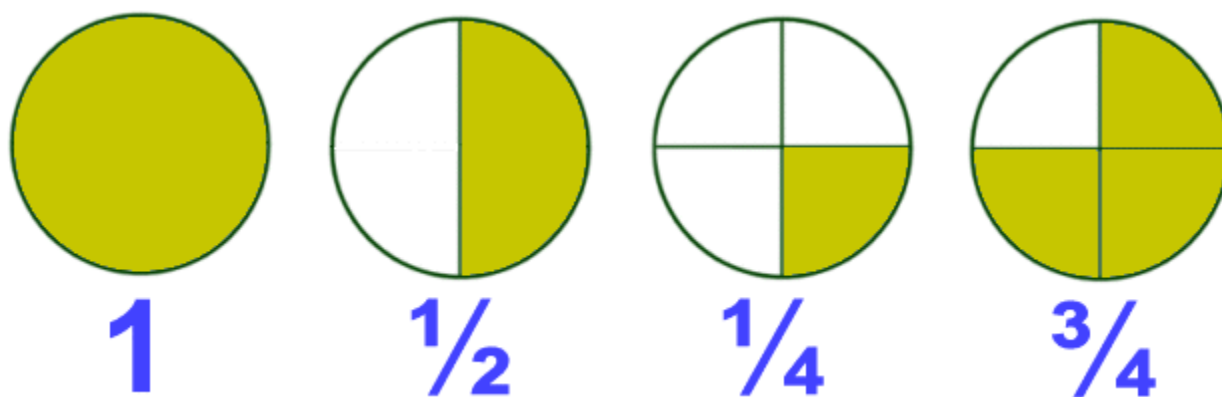
Fraction of a Region

a) Half- Half means one of the two equal parts of a whole. Take a square sheet of paper. Fold it exactly into two equal parts crease the folding well and unfold the paper. Both are parts of a

whole. The two equal parts are of the same size and each is called a half. It is represented as $\frac{1}{2}$ and is read as one by two.

b) Thirds- Third means three equal parts of a whole. When a whole is divided into three equal parts, then each part represents one-third of the whole. It is represented as $\frac{1}{3}$. If two parts out of three are covered, then it is called as two thirds. It is represented as $\frac{2}{3}$.

c) Fourths- Fourth means four equal parts of a whole. When a whole is divided into four equal parts, then each part represents one fourth or quarter of the whole. It is represented as $\frac{1}{4}$. If three parts are covered, then it is called three fourths. It is represented as $\frac{3}{4}$



4. Roman Numbers : Numbers in this system are represented by combinations of letters from the Latin alphabet. It originated from ancient Rome and remained the usual way of representing the numbers.

Basics :



✓ Numerals I, V, X, L, C, D, and M are used for 1, 5, 10, 50, 100, 500 and 1000.

✓ Repeating a numeral up to three times represents addition of the number. For example, III represents $1 + 1 + 1 = 3$. Only I, X, C, and M can be repeated; V, L, and D cannot be.

✓ Writing numerals that decrease from left to right represents addition of the numbers. For example, LX represents $50 + 10 = 60$ and XVI represents $10 + 5 + 1 = 16$.

✓ Writing a smaller numeral to the left of a larger numeral represents subtraction but it is applicable only to I, X and C .

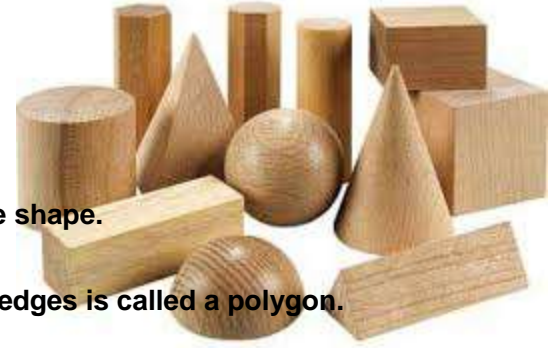
- ✓ For larger numbers, a bar over a numeral means to multiply the number by 1000. For example, \overline{D} represents $500 \times 1000 = 500,000$ and \overline{M} represents $1000 \times 1000 = 1,000,000$, one million.

5. Shapes and Symmetry:-

Plane Shape -Any shape that can be drawn in the plane is called a plane shape.



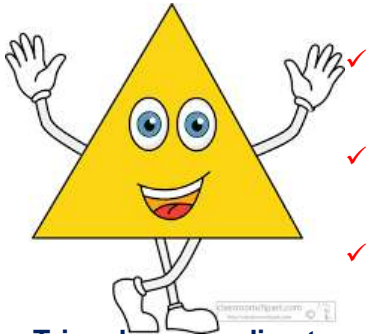
- ✓ A closed shape with only straight sides as edges is called a polygon.
- ✓ Triangle is the simplest polygon.
- ✓ Circles and semicircles are not polygons because they have curved sides.
- ✓ When all the sides of a polygon are equal, it is equilateral .If all the angles of a polygon are equal, it is equiangular. When a polygon is both equilateral and equiangular, it is a regular shape. Equilateral triangles, squares are regular.



Types of Plane shapes:-

Triangles:- A triangle is a closed shape with three sides. It is classified according to its sides or angles, with three kinds each.

Triangles according to sides:-



- ✓ **Equilateral triangles:** These have three sides equal and three angles equal. Their angles are always 60° .
- ✓ **Isosceles triangles:** These are the triangles in which two of the sides are equal. The non-included angles of the sides are also equal.
- ✓ **Scalene triangles :** These have no equivalence at all.

Triangles according to angles:-

- ✓ **Right triangles :** These are the triangles with a right angle. The longest side of such triangles is called a hypotenuse.
- ✓ **Obtuse triangles :** These are the triangles with an obtuse angle.
- ✓ **Acute triangles :** These are the triangles with no right or obtuse angle.

Quadrilaterals :A quadrilateral is a closed shape with four sides. Some common types of quadrilaterals:-

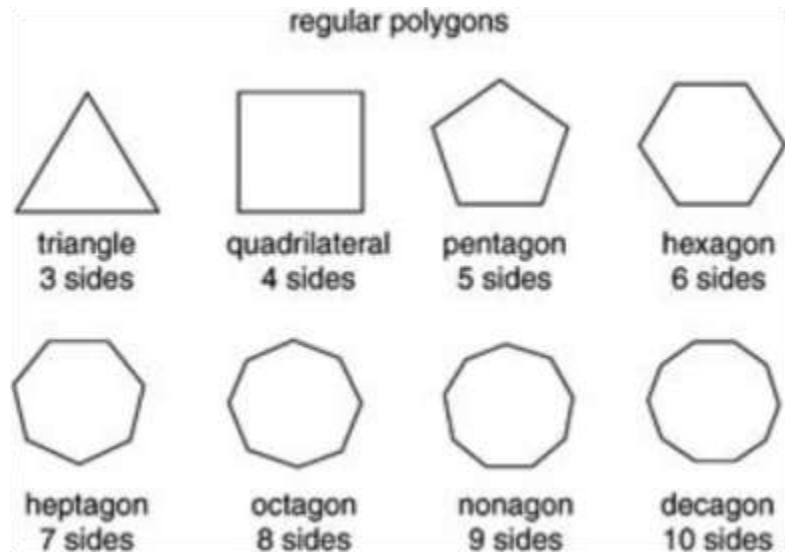
- ✓ **Parallelograms** are shapes where opposite sides and angles are equal.
- ✓ **Rectangles** are parallelograms where all the angles are 90° . Its breadth is the shorter sides, and length is its longer ones.



- ✓ **Rhombuses** are parallelograms where all the sides are equal, and opposite angles are equal.
- ✓ **Squares** are parallelograms that are both rectangles and rhombuses, i.e. all angles are right and all sides are equal.
- ✓ **Trapezium** have two opposite sides that are parallel.

Common names of some polygons with multiple sides.

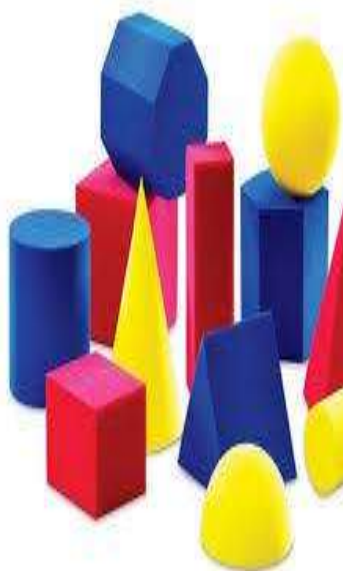
Number of sides	Name of polygon
3	triangle
4	quadrilateral
5	pentagon
6	hexagon
7	heptagon
8	octagon
9	nonagon
10	decagon
12	dodecagon



Circles – The corner-less closed figure all the parts of boundary of which are equidistant from a fixed point called center of circle.

Solid Shapes:-A solid shape is a three-dimensional figure that has width, depth and height. Examples of solid shapes include cubes, pyramids and spheres.

Some common solid shapes:-



- ✓ **Cuboids** are solid figures having six faces, that are rectangles. Some examples may include a book, a piece of furniture, or a jewelry box.
- ✓ **Cubes** are just a special case of cuboids. Cubes are solid figures that have six faces that are all squares of the same size.
- ✓ **Cone** is a solid figure that has a circular face on one end, called the base, and a point at the other end where the sides meet.
- ✓ **Cylinder** is a solid figure that has two circular bases and one curved side.
- ✓ **Sphere** is a solid figure that is round and has the shape of a ball.
- ✓ **Pyramid** is a solid figure that has a polygon as its base on one end and triangular faces all meeting at a single point on the other end.

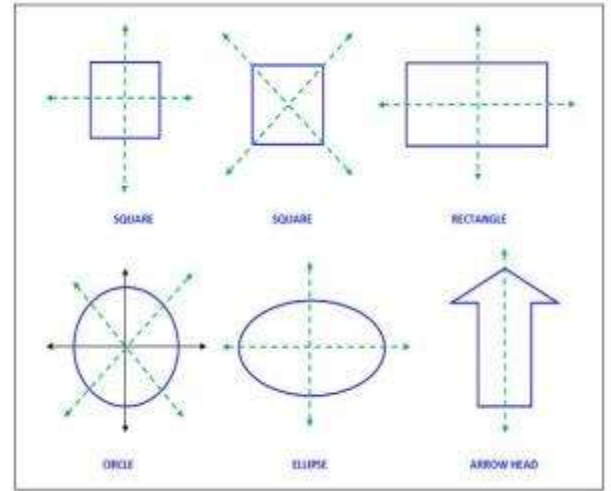
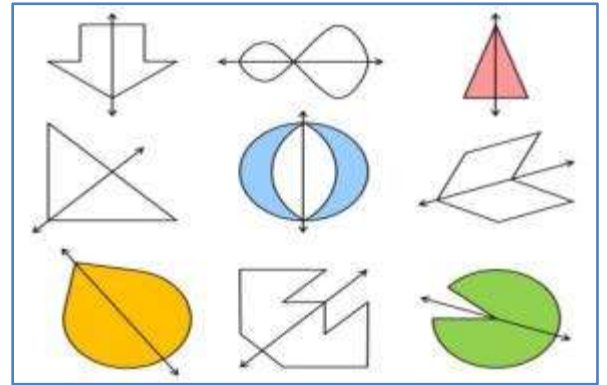
Symmetry

Two figures are called symmetrical, if one-part overlaps the other completely. The line dividing the picture in the middle forms two equal halves. The line is called as the line of symmetry or the axis of symmetry.

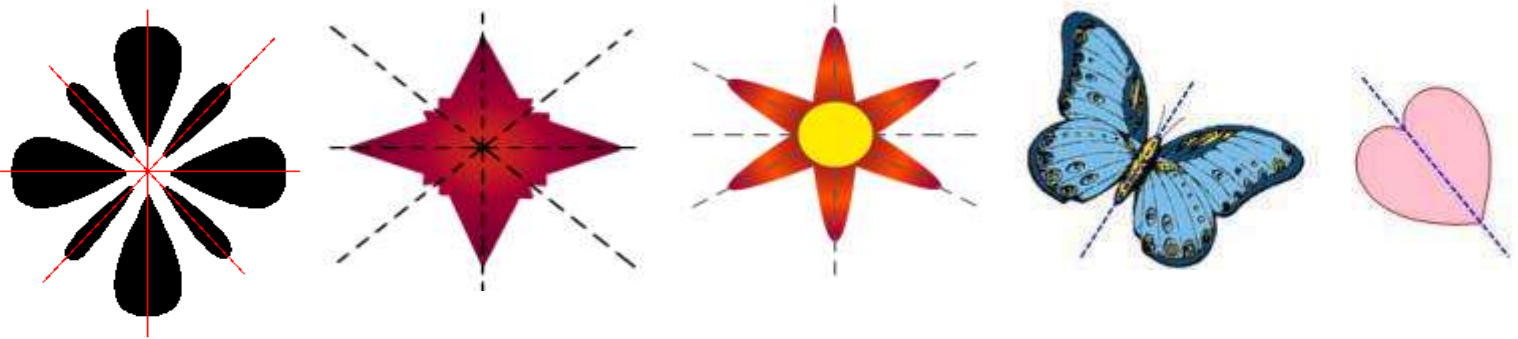
It can be horizontal, vertical or slant.

Axis of Symmetry

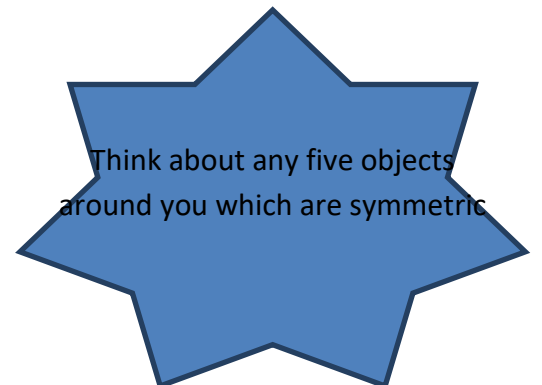
The line of symmetry is a straight line which is either Horizontal, vertical or slant. There can be more than One line of symmetry for a plane figure. The triangle has 3 axes of symmetry. A circle has many line of symmetry. The line of symmetry divides the plane figure in to two identical parts. The idea of symmetrical figures is used in origami, which is the art of paper folding and drawing symmetric designs on fabrics, greeting cards, decorative objects etc.



Different designs with the line of symmetry



Alphabets with the line symmetry



6.Clock and Calendar: Time is the ongoing sequence of events taking place.We

measure time using seconds, minutes, hours, days, weeks, months and years.

Clocks measure time.



To read a clock :

- ✓ Look at the numbers on the perimeter of the clock face. ...
- ✓ Locate the shorter hand, which tells you the hour. ...
- ✓ Find the longer hand, which will point to the minutes. ...
- ✓ Use the longer hand to find individual minutes between numbers. ...
- ✓ Read the time. ...

12 hours and 24 hours clock notations:



- ✓ AM and PM are abbreviations that tell us whether the time occurs in the morning or in the afternoon/evening.
- ✓ AM occurs in the morning. It stands for ante meridiem which means "before midday". You can think of it as "before noon".
- ✓ PM occurs in the afternoon and evening. It stands for post meridiem which means "after midday". You can think of it as "after noon".
- ✓ In the AM/PM system of time, a 12-hour clock is used. That means that the morning goes up until 12:00 noon and it starts over again with 01:00 and goes through 12:00 midnight.
- ✓ In contrast, a 24-hour clock does not start over after 12:00 noon. The next hour (which we normally think of as 1:00 PM) is 13:00, then 14:00 etc. Time goes all the way up until 24:00 midnight which can also be called 00:00 because it is the start of the next day.

Calendar

There are many ways of measuring time in months, week or days and that is called calendar.

One calendar has 12 months, 52 weeks, 365 days. The leap year has 366

Days in a year. We read the calendar to tell the days and dates. The month

Of January, March, May, July, August, October, and December have 31

Days each. The months of April, June, September and November have 30

Days each. Further seven days of the week are Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday.



The Birth of Calendar-

What is a month? Why do we have twelve months in a year? And why doesn't each month have the same number of days? The word month comes from the old English word 'Monath' and 'Monath' comes from Mona which means moon. So, a month is a moon.

Long ago a month really was a moon. That is, a monath was the time from one new moon to the next. But twelve such moons add up to only about 354 days which is the time it takes the earth to go around the sun.

To make the months the same number of days as the sun-year, we have months of different lengths. It regularly adds up to 365 days and a leap year comes to 366 days. In this way, the months keep time with the seasons.

Problem solving based on the calendar-

- a) The 1st term holidays for school started from the 13th of October and students were told that the school reopens on the 25th of October. How many days did they get as holidays?

Leap Year- If the year can be divided by 4, then it is a leap year. In a leap year, February has 29 days.

Find whether the given year are leap or not: 1956, 1947, 1980, 1992, 1998, 1990, 1960, 2000.

7. Pictorial presentation of Data: Representing the information in a table, lists or by means of pictorial form is the smart chart.

Types of Charts:-

1. Tally Marks -Tally marks are represented as numbers in groups of five. One vertical line is made for each of the first four numbers; the fifth number is represented by a diagonal line across the four lines.

2. Pictograph : Pictorial representation of statistics on a chart, graph or table is pictograph. It is a way of showing data using images. Each image stands for a certain number of things.

3. Bar Graphs : A bar graph contains a bar for each category of a set of qualitative data. The bars are arranged in a manner so that the tallest bar represents the highest value.

4. Pie Chart : A pie chart displays data in the form of a circular plate also called pie.

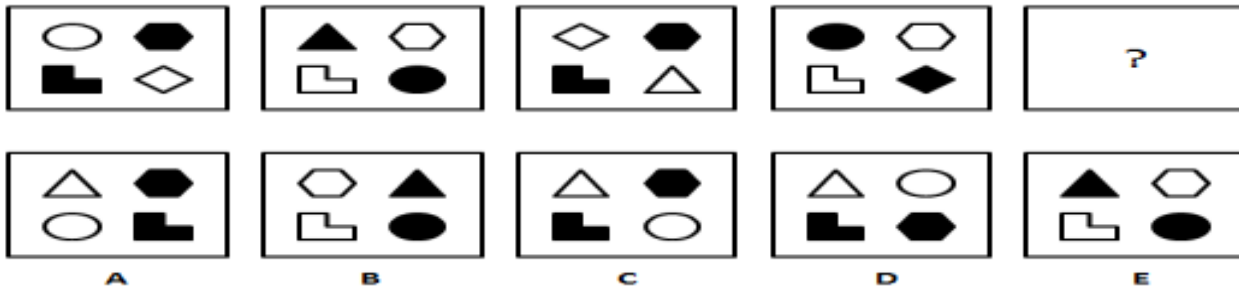
8. Series & Patterns: -Things that are arranged systematically and follow a rule are said to be in pattern. Number patterns are numbers ordered in a manner following some rules.

- ✓ Look at the last one or two digits or the first digit to see any special manner.
- ✓ Think about common number patterns, like counting by 2s, 5s, or 10s.
- ✓ Find the difference between the numbers.

Rules of patterns

A pattern can be a shapes, numbers or words that is repeated according to the rule. It can be of different types.

Repetition of shapes with shades



Here in the given picture option C is the correct answer

Series-

This type of questions can include various types of series and patterns formation- choosing series, odd one out , matching pairs etc.

Example: Find the next letter in the series

Z Y W T P K?

Answer: C

Explanation: The answer is E, because the pattern is to count backwards from the first given letter: first one, then two, then four, and lastly six.

Example: Find the odd one out.

- 1) EHG 2) JML 3) UYX 4) TWV

Answer: 3

Explanation- In all other groups there is a gap of one letter as in the alphabet between first and third letter.

9. Coding and Decoding-

A CODE is a system of signals. Therefore, coding is a method of transmitting a message between the sender and the receiver without a third person knowing it. Decoding is a process to understand a code language.

10. 15 years 5 weeks =----- weeks.

- a) 758 weeks b) 780 weeks c) 785 weeks d) 790 weeks

11. 42 hours 35 minutes =----- minutes

- a) 2505 min b) 2050 min c) 2550 min d) 2555 min

12. Fraction equivalent to $\frac{7}{9}$ with denominator 81 is _____.

- a) $\frac{49}{81}$ b) $\frac{49}{63}$ c) $\frac{63}{81}$ d) $\frac{70}{81}$

13. Cost of 18 tables is Rs.5904. What will be cost of 12 tables?

- a) 3636 b) 3396 c) 3936 d) 3963

14. Which is a method of graphical representation of data using symbol?

- a) Frequency Table b) Bar graph c) Tabular form d) Pictograph

15. Simplify: $76 + 8 \times 3 - 9 + (17-5) = ?$

- a) 113 b) 110 c) 103 d) 100

ANSWER KEY

Questions: 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15.

Answers: b. a. a. d. b. d. d. b. a. c. d. c. c. d. c.