MATHS LAB ACTIVITIES (2018 – 19)

S.NO	ACTIVITIES
1.	To verify by Graphical method that sum of first n odd numbers is equal to n^2.
2.	To verify exterior angle sum property of a quadrilateral
3.	To find angle bisector, median ,altitude and perpendicular bisector by paper folding.
4.	Representation of data in a pie chart
5.	Verification of algebraic identity : $(a + b)^2 = a^2 + 2ab + b^2$
6.	To compare Simple Interest and Compound Interest graphically
7.	To count the vertices, edges and faces for different polyhedra : prisms and pyramids ,and to verify Euler's formula for them.
8.	To obtain the mirror image of a given geometrical figure with respect to the x-axis and the y-axis.

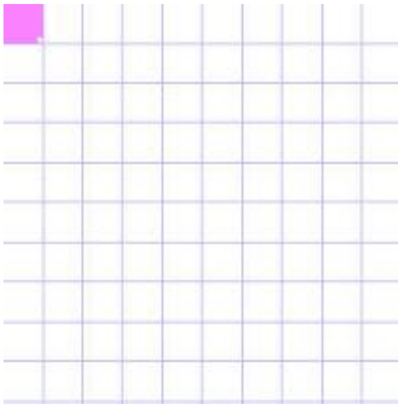
ACTIVITY 1

AIM – To verify by Graphical method that sum of first n odd numbers is equal to n^2.

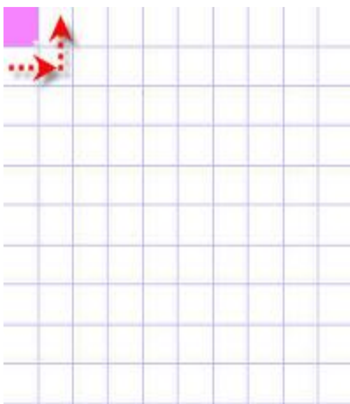
MATERIAL REQUIRED – Squared paper, pair of scissors, coloured markers.

PROCEDURE – 1**.** Let n = 10. Cut a square of dimension 10 x 10 units from a squared paper.

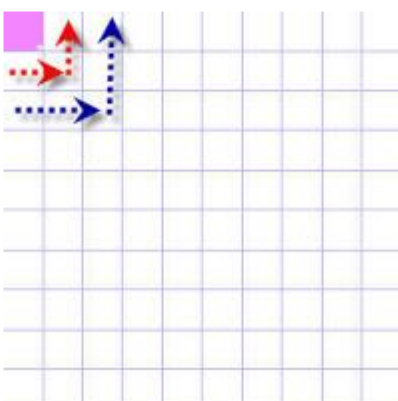
2. To represent 1, shade top left square as shown below.



3. To represent 1 + 3, shade 3 more squares adjacent to previous shaded square as shown below. (marked with Red arrows)



4. To represent 1+ 3 + 5 shade 5 more squares adjacent to previous shaded square as shown below. (marked with blue arrows).



5. Repeat shading squares till you represent 1 + 3 + 5 + 7 + 9 +………… 19. (i.e sum of first n odd natural numbers).

OBSERVATION

$1 = 1 = 1^2$

$1 + 3 = 4 = 2^2$

$1 + 3 + 5 = 9 = 3^2$

$1 + 3 + 5 + 7 = 16 = 4^2$

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.$1 + 3 + 5 + \ldots\ldots\ldots\ldots 19 = 10^2$

CONCLUSION – The sum of first n odd natural numbers is n^2.

ACTIVITY- 2

AIM : To verify exterior angle sum property of a quadrilateral.

OBJECTIVE: To verify that the sum of measures of the exterior angles of any polygon is 360 by paper cutting and pasting.

MATERIAL REQUIRED: A white chart paper, coloured sketch pens, pair of scissors, a ruler, a glue stick, Geometry box.

PROCEDURE:

1) Take the white chart paper and draw a quadrilateral ABCD. Extend the sides of quadrilateral to form exterior angles namely angle 1,2,3,4.
2) By using scissors cut the four exterior angles out of the paper and separate the four angles namely angle 1,2,3, and 4.
3) Now put these four angles at a point X and paste them on a white sheet at X one adjacent to the other.
4) These four angles make up a complete angle around a point X .The measure of a complete angle around a point is 360.
5) Take another white chart paper and draw a pentagon ABCDE. Extend the sides of pentagon to form exterior angles namely angle 1,2,3,4,5.
6) By using scissors cut the five exterior angles out of the paper and separate the five angles namely 1,2,3,4,5 and paste them on a white sheet at Y keeping one angle adjacent to another.
7) These five angles make up a complete angle around the point Y. The measure of a complete angle around a point is 360.

OBSERVATION: We see that the sum of all angles in both the cases is 360.

CONCLUSION: The sum of all exterior angles of any polygon is 360.

ACTIVITY 3

AIM : To find angle bisector, median ,altitude and perpendicular bisector by paper folding.

OBJECTIVE : To carry out the following paper folding activities finding:

The bisector of an angle
The median of a triangle
The altitude of a triangle
The perpendicular bisector of a line segment

PRE-REQUISITE KNOWLEDGE:

Knowledge of basic geometrical terms such as perpendicular bisector, angle bisector and median, altitude

MATERIAL REQUIRED

Coloured sheet of glazed paper, White chart paper ,a pair of scissors ,Geometry box, Fevicol, Sketch pen

A)To find bisector of an angle.

PROCEDURE:

Cut an angle from a coloured glazed paper and name it ∟ABC.

Fold the angle along vertex B such that side BC and BA coincides with each other.

Press and fold to get a crease.

Open the fold and draw a line segment BP on the crease.

OBSERVATION:

By actual measurement ,we observe that ∟ABP = ∟CBP

RESULT

This verifies that BP is angle bisector of ∟ABC.

B) To find median of a triangle

PROCEDURE :

Take a glazed coloured paper and cut out a triangle ABC.

Find the mid points of line segments AB,BC and CA .Name the mid points as D,E and F of sides BC,CA and AB respectively.

Join AD,BE and CF by paper folding. The creases so formed are the required medians

OBSERVATION :

By actual measurement ,we observe that AD,BE and CF are medians of triangle ABC.

RESULT

This verifies that AD,BE and CF are medians of triangle ABC

C) To find altitude

PROCEDURE:

Take a glazed coloured paper and cut out a triangle ABC.

From vertex A fold the triangle in such a way that it is divided into two and a straight crease is formed between two triangles .

Unfold the paper .Name the crease as AD.

Draw a line segment on the crease and it is called as altitude AD.

OBSERVATION:

By actual measurement ,we observe that ∟ADB=∟ADC=90 ˚.

RESULT

This verifies that AD is the altitude of triangle ABC

D)To find perpendicular bisector of a line segment

PROCEDURE :

1)Take a small coloured sheet of glazed paper

2) Fold and press it to create a crease.

3) Draw a line segment AB on this crease.

4) Fold the line segment AB in such a way that point A coincides with point B and press the fold to create a crease .

5) Open the fold and draw a line segment PQ intersecting AB at M.

OBSERVATION

By actual measurement, we observe that

AM=MB and ∟AMP=∟BMP=90˚

RESULT

This verifies that PQ is the perpendicular bisector of AB.

<u>ACTIVITY 4</u>

AIM : To represent the given data in a pie chart

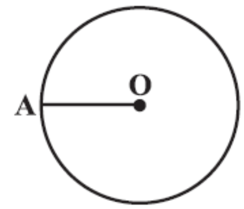
MATERIALS REQUIRED : A white chart paper, Geometry box, Scissors, Fevicol , Colours.

PRE- REQUISITE KNOWLEDGE – Fractional Understanding, Geometry

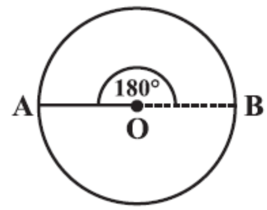
PROCEDURE –

Flavours	Students in fractions preferring flavours	Fractions of 360°
Chocolate	$\frac{1}{2}$	$\frac{1}{2}$ of 360 ° = 180°
Vanilla	$\frac{1}{4}$	$\frac{1}{4}$ of 360 ° = 90°
Other flavours	$\frac{1}{4}$	$\frac{1}{4}$ of 360 ° = 90°

1. Draw a circle with any convenient radius.
   Mark its centre (O) and a radius (OA).



2. The angle of the sector for chocolate is 180°.
   Use the protractor to draw $\angle AOB = 180°$.



3. Continue marking the remaining sectors.

ACTIVITY 5

AIM : Verification of algebraic identity : $(a+b)^2 = a^2 + 2ab + b^2$
OBJECTIVE : To verify the formula $(a+b)^2 = a^2 + 2ab + b^2$ by paper cutting and pasting.
MATERIALS REQUIRED : A white chart paper, coloured sketch pens, pair of scissors, a ruler, glue stick, different coloured papers.
PROCEDURE:
1) Take a red coloured paper ,draw a square with side a= 8cm on it, take a green coloured paper and draw a square with side b= 4cm on it, take a blue coloured paper and draw two rectangles with sides a=8cm, b= 4cm on it. Now by using scissors cut two squares and two rectangles .
2) Now arrange these two squares and two rectangles in the form of a big square of side
   a + b = 12 cm.
3) Now, the area of bigger square = ar(1st square) + ar(two rectangles) + ar(2nd square)
   i.e. (a + b)(a + b) = (a*a) + (a*b) + (a*b) + (b*b)
   $(a+b)^2 = a^2 + 2ab + b^2$

OBSERVATION : Area of the bigger square = 12 * 12 = 144 sq cm.
From arrangement of squares and rectangles,
144 = 64 + 2(32) + 16
$12^2 = 8^2 + 2(4*8) + 4^2$
$(8+4)^2 = 8^2 + 2(4*8) + 4^2$

CONCLUSION: Algebraic identity $(a+b)^2 = a^2 + 2ab + b^2$ is verified.

ACTIVITY 6

OBJECTIVE : To compare Simple Interest and Compound Interest graphically.
MATERIAL REQUIRED :
Graph Paper, geometry box, sketch pens
PRE REQUISITE KNOWLEDGE :
Concept of SI and CI
Formulae to calculate SI and CI
Graphical representation of data
PROCEDURE :
Let us consider that we have to calculate SI on Rs 100 at the rate of 5% p.a. for 5 years.
Find the simple interest and amount after each year on Rs 100 for 5 years and complete the following table.

NO. OF YEARS	PRINCIPAL	SIMPLE INTEREST	AMOUNT
1.			
2.			
3.			
4.			
5			

Now consider P=Rs 100 and R=5% p.a. to find compound interest and amount, after each year, for 5 years.
Complete the following table with different values of CI and A

NO. OF YEARS	PRINCIPAL	AMOUNT	COMPOUND INTEREST
1.			
2.			
3.			
4.			
5			

On a graph paper ,represent the no. of years on x-axis and interest on y-axis.
Use red sketch pen to represent SI and blue sketch pen to represent CI.

OBSERVATION
CI and SI for the first year is same and CI is more than SI for subsequent years.

ACTIVITY 7

AIM :To count the vertices, edges and faces for different polyhedra : prisms and pyramids ,and to verify Euler's formula for them.
MATERIAL REQUIRED :
Models of prisms and pyramids with different bases.
PROCEDURE :

1. Obtain the models of prisms and pyramids with triangular ,rectangular ,pentagonal and hexagonal bases.
2. Observe these models carefully, and for each one of them count the number of vertices, faces and edges
3. Record your observations in the tables given below

S.NO.	PRISM	NO. OF FACES	NO. OF EDGES	NO. OF VERTICES	F-E+V
1.	TRIANGULAR	5	9	6	5-9+6=2
2.	RECTANGULAR				
3.	PENTAGONAL				
4.	HEXAGONAL				

S.NO	PYRAMID	NO. OF FACES	NO. OF EDGES	NO. OF VERTICES	F-E+V
1.	TRIANGULAR				
2.	RECTANGULAR	5	8	5	5-8+5=2
3.	PENTAGONAL				
4.	HEXAGONAL				

OBSERVATION :
Observe from the tables that in each case of each of the polyhedra:
F-E+V=2
This verifies the Euler's formula.

ACTIVITY 8

AIM : To obtain the mirror image of a given geometrical figure with respect to the x-axis and the y-axis.
PRE REQUISITE KNOWLEDGE : Concept of plotting of points on the graph paper.
MATERIAL REQUIRED :
Graph paper, Geometry box
PROCEDURE : 1)Consider any geometrical figure say ABCDE.
2)Plot the mirror images of the points A,B,C,D,E with respect to the x-axis to get mirror image P,Q,R,S,T.
3)Again plot the mirror images of points A,B,C,D,E with respect to y-axis to get mirror image U,V,W,X,Y.
4) Repeat the activity for different geometrical figures
OBSERVATION :
1) The mirror images obtained with respect to the x-axis and y-axis remains same.
2) When the mirror image of a figure is obtained with respect to y-axis ,the y-co-ordinate remains the same
3) When the mirror image of a figure is obtained with respect to x-axis ,the x-co-ordinate remains the same

RESULT :
Through this activity ,we learnt to develop geometrical meaning of reflection symmetry.