VISHNU
UNIVERSAL LEARNING

B V RAJU COLLEGE

VISHNUPUR :: BHIMAVRAM

DEPARTMENT OF MATHEMATICS & HUMANITIES

MIND MAP PRESENTATION

Our department of Mathematics & Humanities has conducted " **MIND MAP PRESENTATION**" program for all the B.Sc., First year student . To improve their explanation skills and thought process, Students were motivated to participated in this event. Total no.of 45 teams participated on this "**MIND MAP EVENT**" and presented their ideas. Their presentation were more focused on Straight lines, Complex numbers, Integration,Matrices,Statistics and Trigonometric Equations as per the new guide lines by APSCHE, one elective skill paper " **ANALYTICAL SKILLS** " was introduced into the regular curriculum for all the first year UG students from the academic year 2023-2024. It is aimed at improving the skills in analyzing the data which is the for most requirement while appearing for written tests in all the competitive exams. So, in order to improve the skills, all the students were provided a work sheet to analyze and solve some problems on their own, after completing a specific topic the students were enthusiastically responded and put their efforts on worksheets. So far two worksheets, one on the topics Ages, Simple interest, Compound interest and another one are on ration, proportion, percentages and partnership were given to all the students.

VISHNU

B V RAJU COLLEGE

VISHNUPUR :: BHIMAVRAM

DEPARTMENT OF MATHEMATICS & HUMANITIES

participants list

S.no	Name of the student	Group	Topic
1	G. Poorna Shalini M. Uma Devi V. Mounika jahnavi	Data science	Straight lines
2	M. Lalitha K. Kavya	Data science	Straight lines
3	B.Sushmitha R. Yashitha	Data science	Complex numbers
4	K. Rohith shekar V. Jagadesh B. Ram Teja	Data science	Complex numbers
5	D. Chidvilas T. Kishore R. Mahesh Babu	Data science	Straight lines
6	B. Sai prasanna V. Devi prasanna B. Jaya sree	Data science	Straight lines
7	G.P.N.V.Bhavani N. Divya sri D. Jyothi sri	B.Sc., Chemistry	Complex numbers
8	K. Vani poojitha K. Hema sri M. Sarayu	B.Sc., Chemistry	Straight lines
9	T. Vani satya praveena N. Sravani V. Bhargavi	B.Sc., Chemistry	Straight lines
10	G. Bruha vani Ch.Keerthi	B.Sc.,C & P	Straight lines
11	K. Mounika T. Greeshma	B.Sc.,Physics	Complex numbers

12	P Satya V. Lakshmi sirisha	B.Sc.,Physics	Complex numbers
13	D. Ravi teja K. Raju V. Santhosh	B.Sc.,C & P	Straight lines
14	T.Kumar eswar chandra	B.Sc., M & S	Straight lines
15	K. Kevin Peterson	B.Sc., M & S	Straight lines
16	G.Naresh	B.Sc., M & S	Complex numbers
17	V. Prasanna	B.Sc., M & S	Straight lines
18	M. Bhagravi	B.Sc., M & S	Straight lines
19	K. Bhavani	B.Sc., M & S	Complex numbers
20	G. Komali	B.Sc., M & S	Complex numbers
21	P. Jyoshna	B.Sc., M & S	Straight lines
22	M. Leela	B.Sc., M & S	Complex numbers
23	M. Kinnera	B.Sc., M & S	Complex numbers
24	M.N.S.S.Teja	B.Sc., M & S	Straight lines
25	D.Manikanta	B.Sc., M & S	Straight lines
26	I. Varshini	B.Sc., Cs-B	Matrices
27	K. Madhu	B.Sc., Cs-B	Straight lines
28	Y. Gheeshmi Y. Usha S.Alekya	B.Sc., Cs-C	Straight lines
29	P.L.N. Pravallika Sk. Beebi	B.Sc., Cs-C	Straight lines
30	Ch. Vishitha	B.Sc., Cs-A	Matrices
31	B.V.Rajyalakshmi	B.Sc., Cs-A	Integration
32	G. Amrutha Varshi	B.Sc., Cs-A	Matrices
33	Ch.Prasanthi	B.Sc., Cs-A	Matrices

34	B.Keerthi	B.Sc., Cs-A	Straight Lines
35	G.Manasa	B.Sc., Cs-A	Integration
36	G.Sirisha	B.Sc., Cs-A	Integration
37	S.Valli Padma	B.Sc., Cs-C	Integration
38	T.H.S.N.Indumathi	B.Sc., Cs-C	Integration & Complex numbers
39	Y.H. S.S.N.Lakshmi	B.Sc., Cs-A	Integration
40	S.Jahnavi	B.Sc., Cs-C	Integration
41	P.Sowmya	B.Sc., Cs-A	Trigonometric Functions
42	K.V.Sujana	B.Sc., Cs-B	Complex numbers
43	N.Nihariki P.Lavanya N.Santoshi	B.Sc., Cs-B	Statistics
44	Y.Geeshmi	B.Sc., Cs-C	Trigonometric Functions
45	K.Sharoni M.Ramya K.Tejaswi	B.Sc., Cs-B	Statistics

****

P Soumya
7

Trigonometric Functions

Identities

$\sin^2x + \cos^2x = 1$

$\sec^2x - \tan^2x = 1$

$\operatorname{cosec}^2x - \cot^2x = 1$

Compound Angles

$\sin(x+y) = \sin x \cos y + \cos x \sin y$

$\sin(x+y) = \sin x \cos y - \cos x \sin y$

$\cos(x+y) = \cos x \cos y - \sin x \sin y$

$\tan(x+y) = \dfrac{\tan x + \tan y}{1 - \tan x \tan y}$

$\tan(x-y) = \dfrac{\tan x - \tan y}{1 + \tan x \tan y}$

$\cot(x+y) = \dfrac{\cot x \cot y - 1}{\cot x + \cot y}$

$\cot(x-y) = \dfrac{\cot x \cot y + 1}{\cot y - \cot x}$

Factorization formula

$\sin(x+y) + \sin(x-y) = 2 \sin x \cos y$

$\sin(x+y) - \sin(x-y) = 2 \cos x \sin y$

$\cos(x+y) + \cos(x-y) = 2 \cos x \cos y$

Take $x+y = A$, $x-y = B$

$\sin A + \sin B = 2 \sin\left[\frac{A+B}{2}\right] \cos\left[\frac{A-B}{2}\right]$

$\sin A - \sin B = 2 \cos\left[\frac{A+B}{2}\right] \sin\left[\frac{A-B}{2}\right]$

$\cos A + \cos B = 2 \cos\left[\frac{A+B}{2}\right] \cos\left[\frac{A-B}{2}\right]$

$\cos A - \cos B = -2 \sin\left[\frac{A+B}{2}\right] \sin\left[\frac{A-B}{2}\right]$

Triple Angle formulae

$\sin 3x = 3\sin x - 4\sin^3 x$

$\cos 3x = 4\cos^3 x - 3\cos x$

$\tan 3x = \dfrac{3\tan x - \tan^3 x}{1 - 3\tan^2 x}$

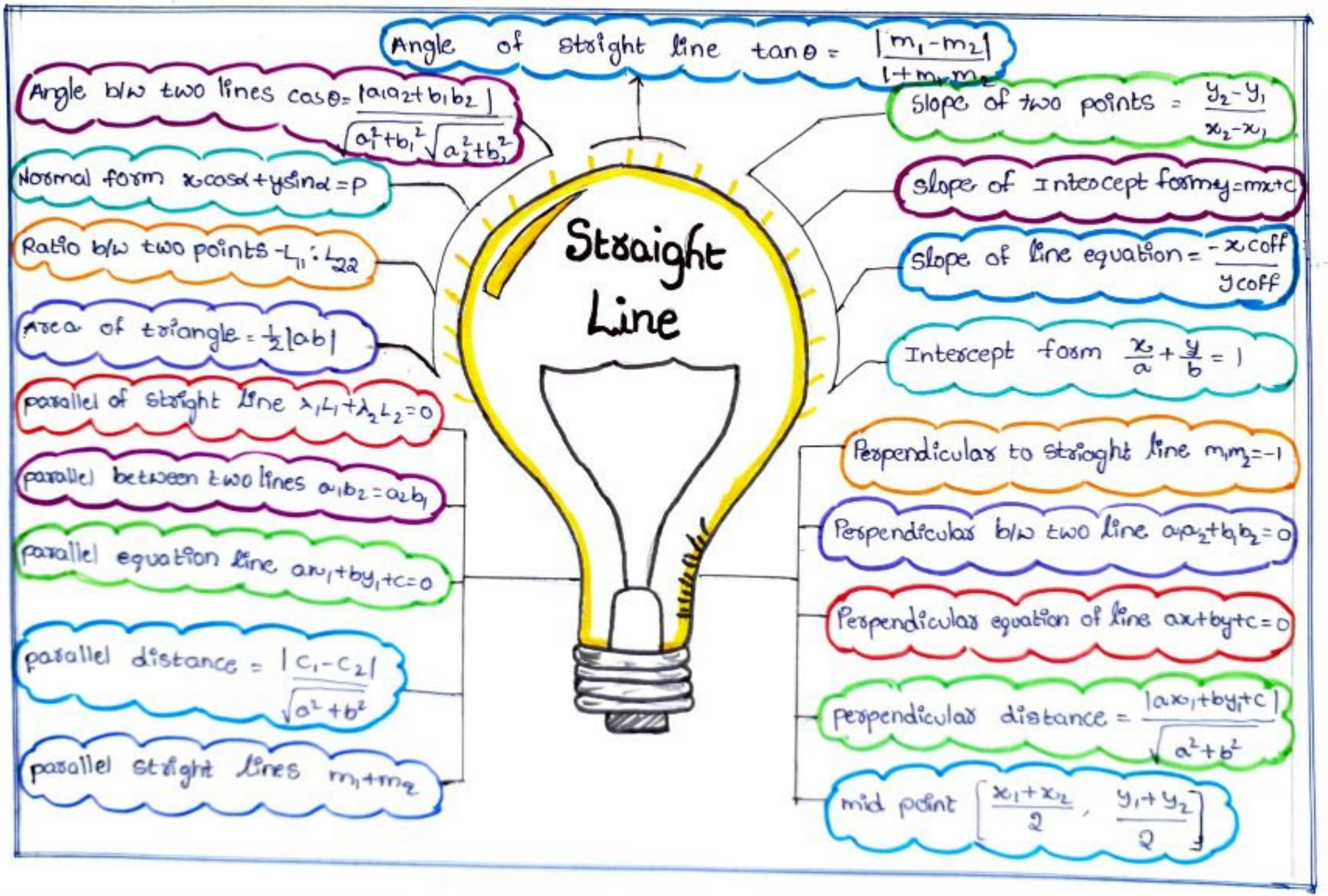
Double Angle formulae

$\sin 2x = 2 \sin x \cos x = \dfrac{2\tan x}{1 + \tan^2 x}$

$\cos 2x = \cos^2 x - \sin^2 x = 2\cos^2 x - 1 = 1 - 2\sin^2 x = \dfrac{1 - \tan^2 x}{1 + \tan^2 x}$

$\tan 2x = \dfrac{2\tan x}{1 - \tan^2 x}$

$\cot 2x = \dfrac{\cot^2 x - 1}{2 \cot x}$



Complex number ($z = a + ib$)

Real part

$Re(z) = a$

Imaginary part

$Im(z) = b$

Cube roots of unity (ω)

(i) $\omega^3 = 1$

(ii) $1 + \omega + \omega^2 = 0$

(iii) $x^3 - 1 = (x-1)(x-\omega)(x-\omega^2)$

Power of i

We know, $i^2 = -1$

So, for any integer K,

$i^{4K} = 1$

$i^{4K+1} = i$

$i^{4K+2} = -1$

$i^{4K+3} = -i$

n^{th} roots of unity

$z^n = 1$

So, $z = \cos\left(\frac{2K\pi}{n}\right) + i \sin\left(\frac{2K\pi}{n}\right)$

where, $K = 0, 1, 2, \ldots, n-1$

Modulus

$|z| = \sqrt{a^2 + b^2}$

properties

(i) $|z_1 + z_2| \leq |z_1| + |z_2|$

(ii) $|z_1 - z_2| \geq |z_1| - |z_2|$

(iii) $|z_1 z_2 z_3 \cdots z_n| = |z_1||z_2||z_3| \cdots |z_n|$

(iv) $\left|\frac{z_1}{z_2}\right| = \frac{|z_1|}{|z_2|}$, provided $|z_2| \neq 0$

(v) $|z^n| = |z|^n$, where n is an integer

Square roots of a negative real number

$\sqrt{-1} = i$

Conjugate

$\bar{z} = a - ib$

properties

(i) $z\bar{z} = |z|^2$

(ii) $\overline{z_1 z_2 z_3 \cdots z_n} = \bar{z}_1 \bar{z}_2 \bar{z}_3 \cdots \bar{z}_n$

(iii) $\overline{z_1 \pm z_2} = \bar{z}_1 \pm \bar{z}_2$

(iv) $\overline{\left(\frac{z_1}{z_2}\right)} = \frac{\bar{z}_1}{\bar{z}_2}$, provided $z_2 \neq 0$

MIND MAP

Straight Line

Point of intersection of two Lines

$x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1}$, $y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1}$

Angle between the two Lines

$\cos\theta = \frac{|a_1a_2 + b_1b_2|}{\sqrt{a_1^2 + b_1^2}\sqrt{a_2^2 + b_2^2}}$

a_1, a_2 & b_1, b_2 — x-intercepts and y-intercepts of the lines

$\tan\theta = \frac{m_1 - m_2}{1 + m_1m_2}$

m_1, m_2 are the slope of lines

Various forms of slopes

$m = \frac{y_2 - y_1}{x_2 - x_1}$

(x_1, y_1) & (x_2, y_2) — two given Points of lines

$m = \tan\theta$

θ = Angle b/w lines

$m = -\frac{a}{b}$

a = Intercept of x

b = Intercept of y

Various forms of a Straight Line

Normal form

$x\cos\alpha + y\sin\alpha = p$

α = Angle made by $\perp r$ with positive x-axis

p = $\perp$ve distance from Origin

Slope intercept form

$y = mx + c$

y = slope, c > y-intercept

Intercept form

$\frac{x}{a} + \frac{y}{b} = 1$

a = Intercept of x

b = Intercept of y

Two Point form

$(y - y_1) = \frac{y_2 - y_1}{x_2 - x_1}(x - x_1)$

(x_1, y_1) & (x_2, y_2) — Two given pt on the line

Point slope form

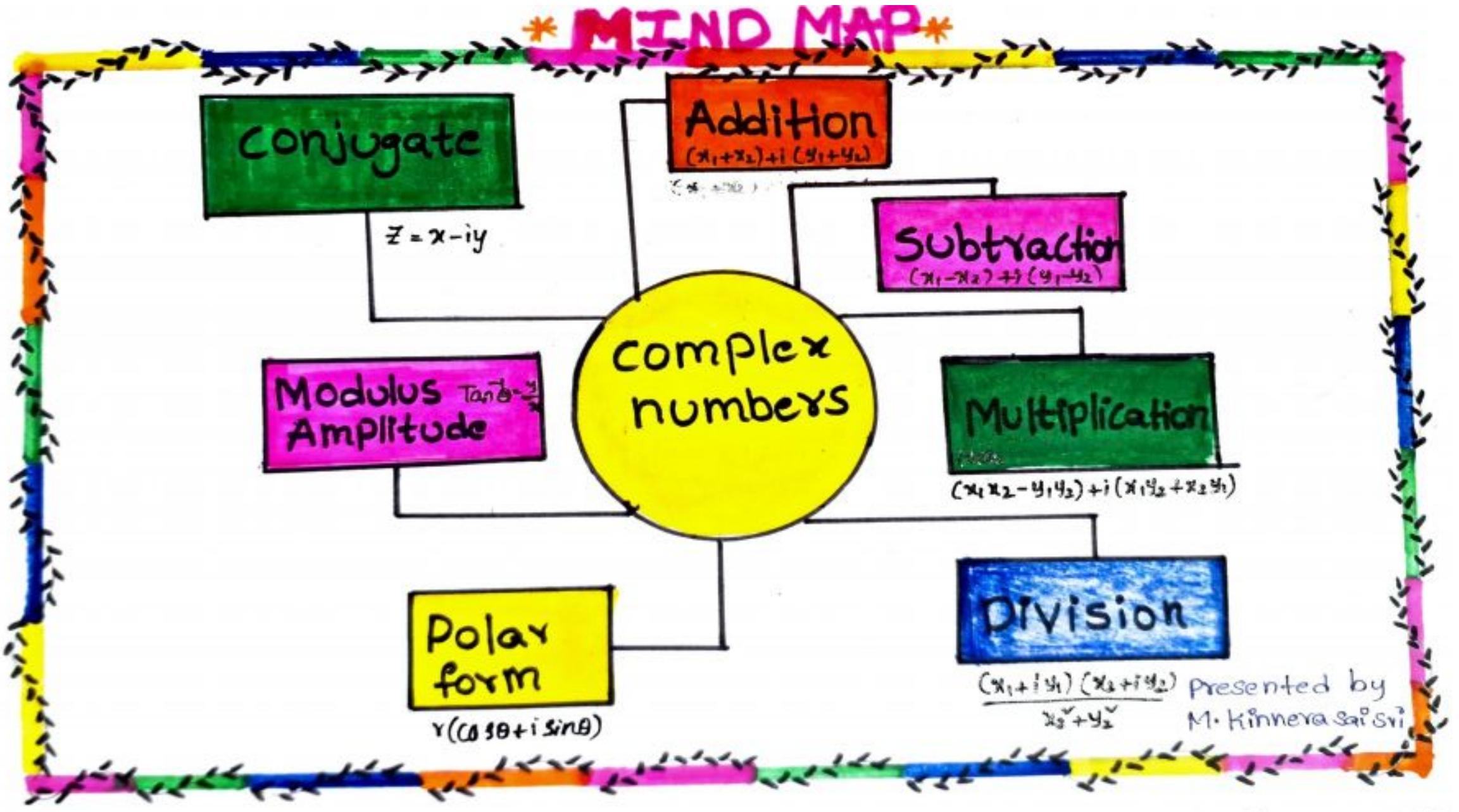
$y - y_1 = m(x - x_1)$

m = slope

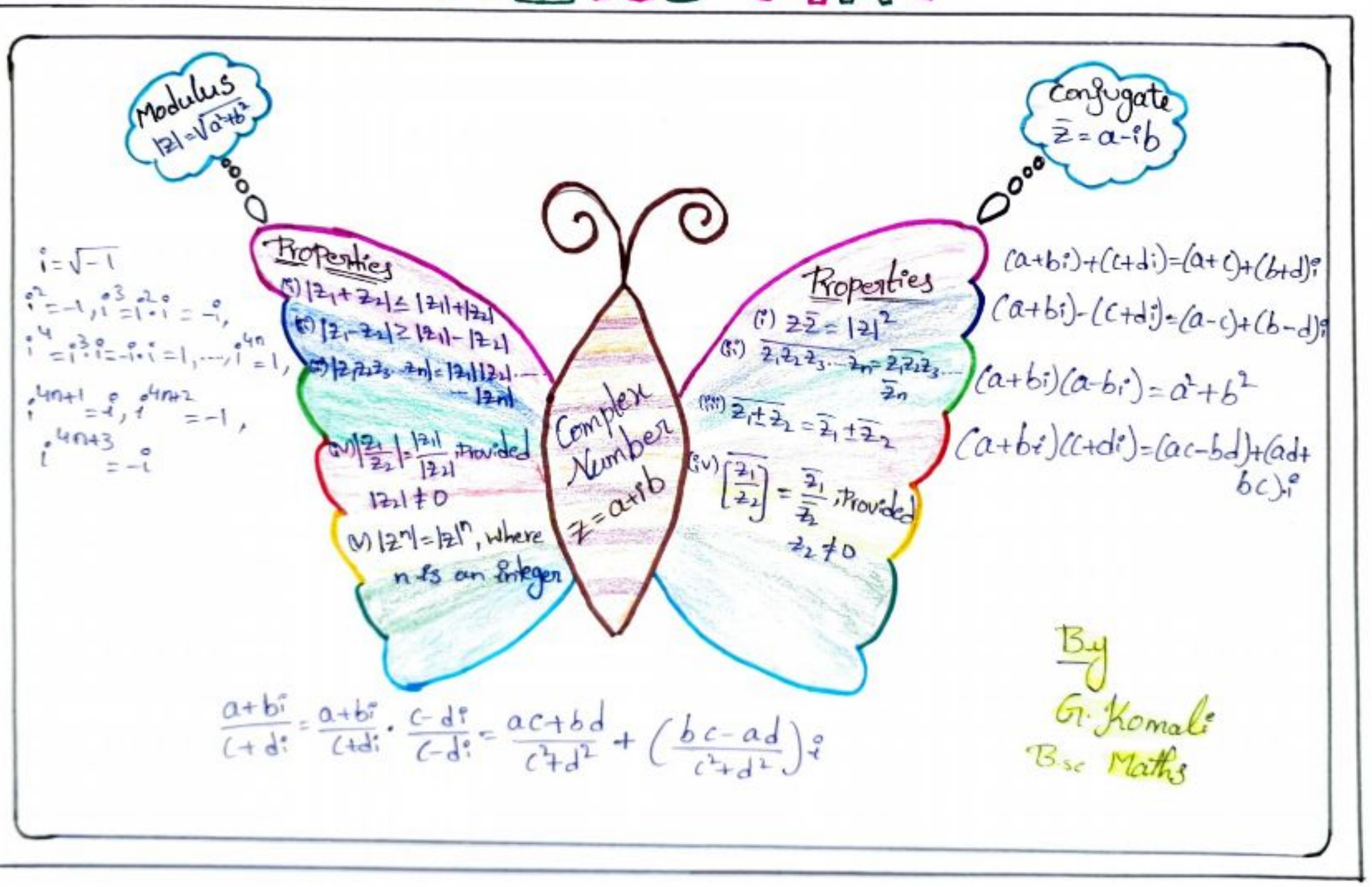
(x, y) point of given Line.

By
M Bhargavi
BSC: Statistics

MIND MAP



MIND MAP



MIND MAP

Slope-intercept form

$y = mx + c$, c is length of y intercept, m is slope

Two-point form

$$y - y_1 = \frac{y_2 - y_1}{x_2 - x_1}(x_2 - x_1)$$

point-slope form

$$y - y_1 = m(x - x_1)$$

Intercept form

$$\frac{x}{a} + \frac{y}{b} = 1.$$

Point of Intersection

The pt of intersection of two non-parallel lines

$$x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1}, \quad y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1}$$

Equation of the line parallel & perpendicular

Equation of any line parallel to $ax + by + c = 0$ is $ax + by + k = 0$.

Equation of the line perpendicular to $ax + by + c = 0$ is

$bx - ay + k = 0$

k = constant

Equation of a line parallel to $ax + by + c = 0$ and passing through the point x_1, y_1 is

$$a(x - x_1) + b(y - y_1) = 0.$$

Equation of line $\perp^{r}$ to $bx - ay + c$ and passing through the point x_1, y_1 is

$$b(x - x_1) - a(y - y_1) = 0$$

Distance of a point from a line:

$$\frac{|ax_1 + by_1 + c_1|}{\sqrt{a^2 + b^2}}$$

Distance b/w two parallel lines are

$$\left| \frac{c_1 - c_2}{\sqrt{a^2 + b^2}} \right|$$

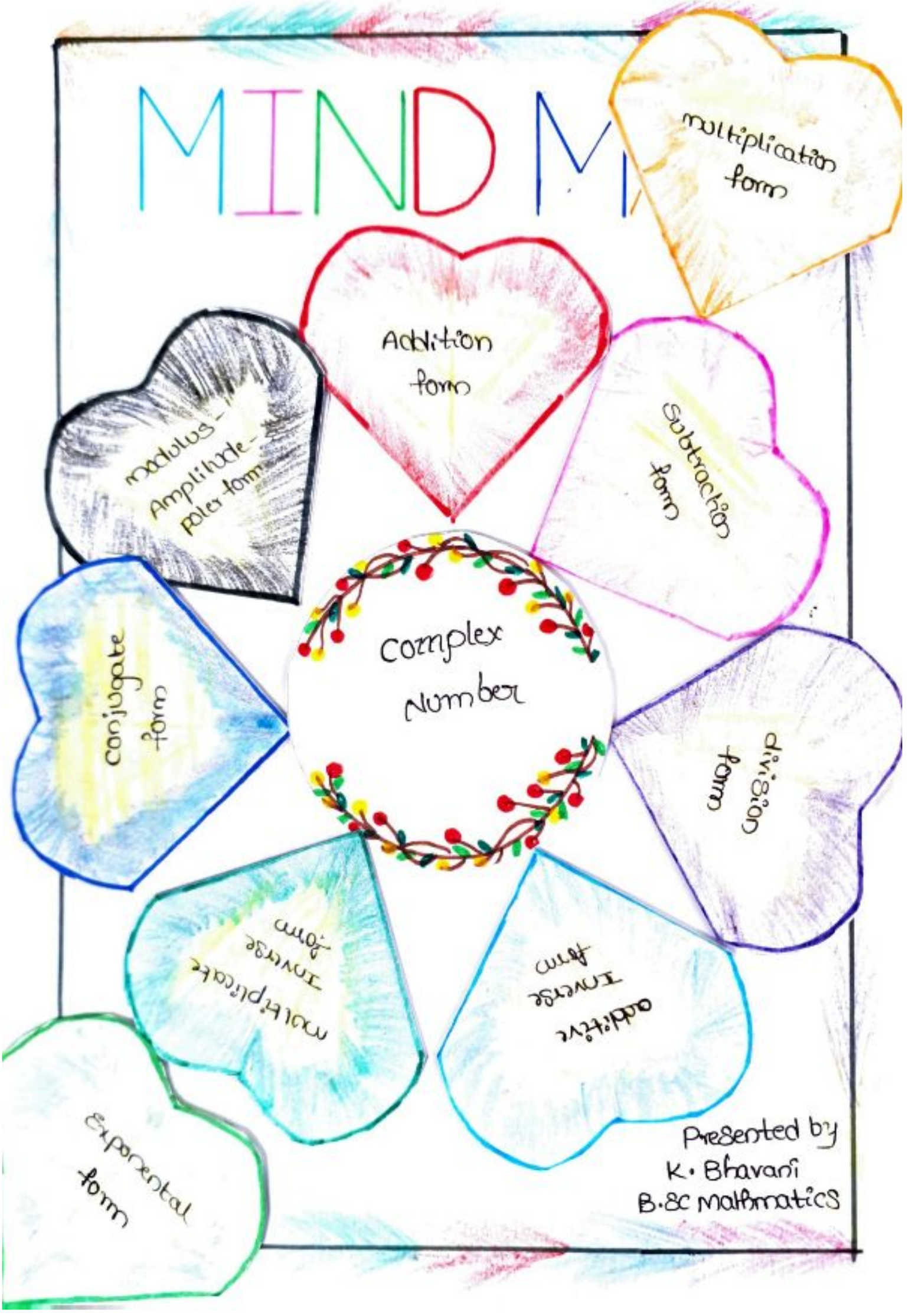
Angle b/w two lines

$$\cos\theta = \frac{|a_1a_2 + b_1b_2|}{\sqrt{a_1^2 + b_1^2}\sqrt{a_2^2 + b_2^2}}$$

Straight Lines.

Presented by
V. Prasanna
BSC-Stat

MIND MAP



Presented by
K. Bhavani
B.Sc Mathmatics

ALGEBRA OF COMPLEX NUMBERS

Addition

$$Z_1+Z_2=(a+c)+i(b+d)$$

Subtraction

$$Z_1-Z_2=Z_1+(-Z_2)$$
$$=(a-c)+i(b-d)$$

Algebra of Complex Numbers

$$Z_1=a+ib$$
$$Z_2=c+id$$

Multiplication

$$Z_1\times Z_2=(a+ib)(c+id)$$
$$=(ac-bd)+i(ad+bc)$$

Division

$$\frac{Z_1}{Z_2}=\frac{a+ib}{c+id}$$
$$=\frac{(a+ib)}{(c+id)}\times\frac{(c-id)}{(c-id)}$$
$$=\frac{(ac+bd)+i(bc-ad)}{c^2+d^2}$$

K. Venkata Sujana
I st Year BSC. CS (B)

MEAN

7, 3, 4, 1, 7, 6

Sum of numbers divided by the total numbers

Mean = (7+3+4+1+7+6)/6

$= \frac{28}{6}$

$= 4.66$

MEDIAN

7, 3, 4, 1, 7, 6

Arrange in Order and pick the middle value

1, 3, 4, 6, 7, 7

Median = $\frac{6+4}{2}$

$= 5$

MODE

7, 3, 4, 1, 7, 6

Most Common number

7, 3, 4, 1, 7, 6

Mode = 7

RANGE

7, 3, 4, 1, 7, 6

Difference between highest and lowest

Range = 7 - 1 = 6.

MATRICES

OPERATIONS

Addition / Subtraction

$$A+B=\begin{bmatrix} a_1+b_1 & a_2+b_2 \\ a_3+b_3 & a_4+b_4 \end{bmatrix}$$

$$A-B=\begin{bmatrix} a_1-b_1 & a_2-b_2 \\ a_3-b_3 & a_4-b_4 \end{bmatrix}$$

properties

Commutative law: $A+B=B+A$

Associative law: $(A+B)+C=A+(B+C)$

Identity of the Matrix: $A+0=0+A=A$, where 0 is a zero matrix

Additive inverse: $A+(-A)=0=(-A)+A$, where $(-A)$ is obtained by changing the sign of every element of A.

Scalar Multiplication

$kA_{m\times n} = A_{m\times n}k = [k a_{ij}]$

properties

$k(A+B)=kA+kB$

k is scalar in nature

$(k+l)A=kA+lA$

k, l are scalars

Multiplication

$$AB=\begin{bmatrix} a_1b_1+a_2b_3 & a_1b_2+a_2b_4 \\ a_3b_1+a_4b_3 & a_3b_2+a_4b_4 \end{bmatrix}$$

properties

Not commutative $AB \neq BA$

Multiplicative identity

$IA=AI=A$

Associative law: $(AB)C=A(BC)$

Distributive law: $A(B+C)=AB+BC$

ch. Vishitha
CS-A Roll No: 19