

SULIT



BAHAGIAN PEPERIKSAAN DAN PENILAIAN  
JABATAN PENDIDIKAN POLITEKNIK  
KEMENTERIAN PENDIDIKAN MALAYSIA

JABATAN MATEMATIK, SAINS DAN KOMPUTER

PEPERIKSAAN AKHIR  
SESI DISEMBER 2014

**DBM1023: MATHEMATICS COMPUTING**

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**TARIKH : 16 APRIL 2015**  
**MASA : 2.30 PM - 4.30 PM (2 JAM)**

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Kertas ini mengandungi **SEPULUH (10)** halaman bercetak.

Bahagian A: Struktur (5 soalan)

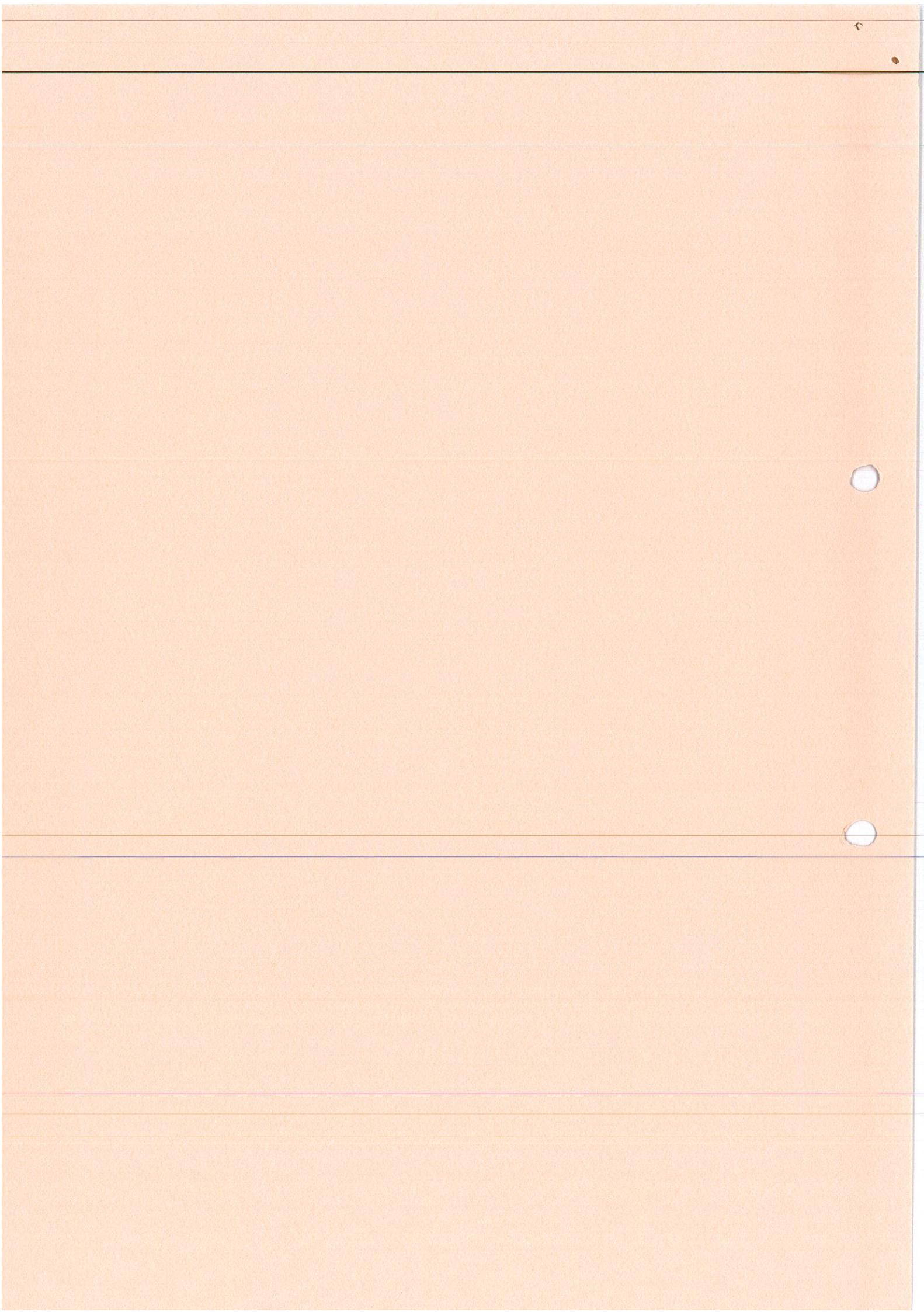
Dokumen sokongan yang disertakan : Kertas Graf, Formula dsb / Tiada

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**JANGAN BUKA KERTAS SOALANINI SEHINGGA DIARAHKAN**

(CLO yang tertera hanya sebagai rujukan)

SULIT



**SECTION A : 100 MARKS**  
**BAHAGIAN A : 100 MARKAH**

**INSTRUCTION:**

This section consists of **FIVE (5)** structured questions. Answer **FOUR (4)** questions only.

**ARAHAN:**

*Bahagian ini mengandungi **LIMA (5)** soalan berstruktur. Jawab **EMPAT (4)** soalan sahaja.*

**QUESTION 1**

**SOALAN 1**

- |            |   |            |
|------------|---|------------|
| CLO1<br>C1 | a) State the definition of the following terms:<br><i>Nyatakan maksud bagi istilah yang berikut:</i>        |            |
|            | i) Bit  | [2 marks]  |
|            |   | [2 markah] |
|            | ii) Bytes   | [2 marks]  |
|            |   | [2 markah] |
| CLO1<br>C2 | (b) Express each of the following numbers in base-8:<br><i>Nyatakan nombor-nombor berikut dalam asas 8:</i> |            |
|            | i. D7F <sub>16</sub>  | [3 marks]  |
|            |   | [3 markah] |
|            | ii. 6772 <sub>10</sub>  | [3 marks]  |
|            |   | [3 markah] |

CLO 1  
C3(c) i) Compute the values of  $x$  and  $y$  of the following numbers.*Kirakan nilai  $x$  dan  $y$  bagi nombor-nombor berikut.*

a.  $111\text{xxx}000111_2 = 3591_{10}$  [3 marks]

*[3 markah]*

b.  $10110111110_2 = 26y6_8$  [4 marks]

*[4 markah]*

ii) Solve the following binary arithmetic operations and give your answers in binary form.

*Selesaikan operasi arimetik yang berikut dan berikan jawapan dalam bentuk perduaan.*

a.  $101001111_2 - 50_8 + 6F_{16}$  [4 marks]

*[4 markah]*

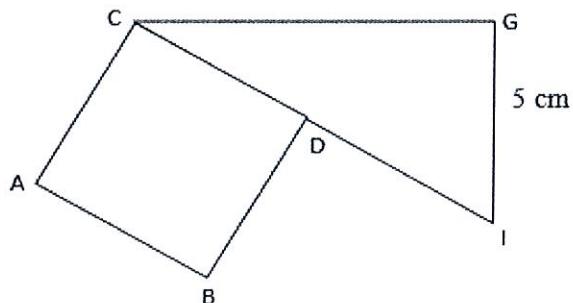
b.  $11111_2 \times 11111_2$  [4 marks]

*[4 markah]*

**QUESTION 2****SOALAN 2**CLO1  
C2

- (a) By referring to Figure 2a, ABCD is a square and CGI is a right angled triangle. If CI = 13cm and GI=BD, find the total perimeter of the diagram.

*Merujuk kepada Rajah 2a, ABCD adalah segiempat sama dan CGI adalah segitiga bersudut tepat. Jika CI = 13cm dan GI = BD, cari jumlah perimeter keseluruhan rajah.*

**Figure 2a***Rajah 2a*

[4 marks]

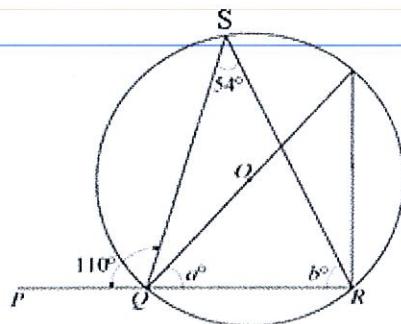
[4 markah]

CLO 1  
C2

- (b) Figure 2b shows a circle with the centre O. PQR is a straight line. Calculate  $a + b$ .

*Rajah 2b menunjukkan sebuah bulatan berpusat O. PQR ialah garis lurus.*

*Kirakan  $a + b$ .*

**Figure 2b***Rajah 2b*

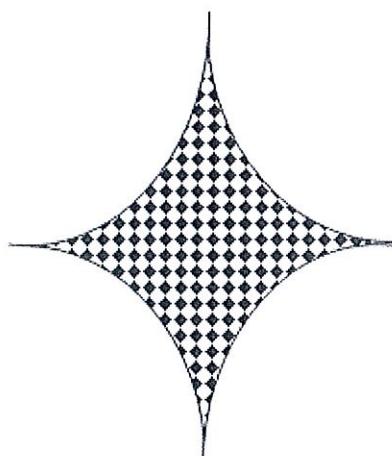
[6 marks]

[6 markah]

CLO2  
C3

- (c) i) Diagram 2c(i) shows a shape made up of four-quarter circular arcs, each of radius 5 cm, joined together. Compute the area of the shaded region.

*Rajah 2c(i) menunjukkan sebuah objek yang terdiri daripada empat lengkuk sukuan bulatan yang setiap satunya berjejari 5 cm dan bersambung antara satu sama lain. Kirakan keluasan kawasan berlorek.*



**Figure 2c(i)**

*Rajah 2c(i)*

[7 marks]

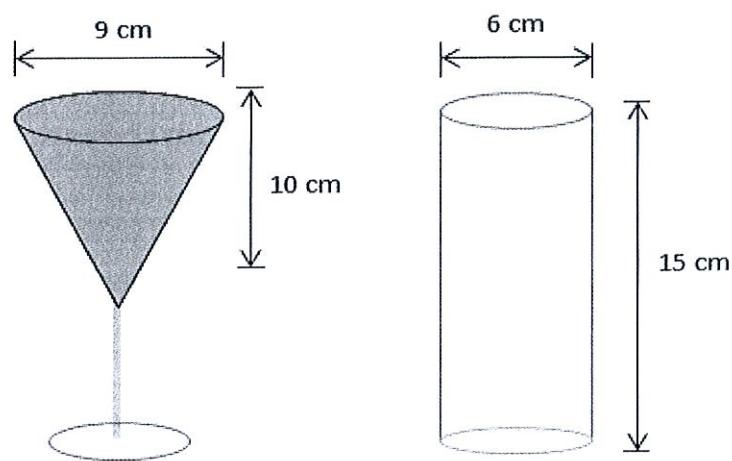
[7 markah]

CLO2  
C3

- ii) Figure 2c(ii) shows a conical glass drinkware and a cylindrical glass drinkware. The conical glassware is fully filled with orange juice. The orange juice from the conical glassware is then poured into the cylindrical glass. Compute:

*Rajah 2c(ii) menunjukkan gelas minuman berbentuk kon dan silinder. Gelas berbentuk kon dipenuhi dengan jus oren. Kesemua jus dalam gelas kon tersebut kemudiannya dituang ke dalam gelas silinder.*

*Kirakan:*



**Figure 2c(ii)**

*Rajah 2c(ii)*

- a. The height of the orange juice in the cylindrical glass

*Ketinggian jus dalam gelas silinder tersebut*

[4 marks]  
[4 markah]

- b. The volume of orange juice required to fully fill the cylindrical glass.

*Isipadu jus oren yang perlu ditambah bagi memenuhi gelas silinder tersebut.*

[4 marks]  
[4 markah]

**QUESTION 3****SOALAN 3**

CLO1

C1

- (a) State each of the following complex number in term of
- $a + bi$
- :

*Nyatakan setiap yang berikut dalam bentuk  $a + bi$ :*

i.  $(3 + 2i) + (1 + 5i)$  [2 marks]

[2 markah]

ii.  $(-9 - 4i) - (-6 - 8i)$  [2 marks]

[2 markah]

CLO 1

- (b) If
- $z_1 = 2 + 5i$
- and
- $z_2 = 3 - 2i$
- , determine :

C2

*Jikaz<sub>1</sub> = 2 + 5 dan z<sub>2</sub> = 3 - 2i, tentukan :*

i.  $z_1 \times z_2$  [3 marks]

[3 markah]

ii.  $\frac{z_1}{z_2}$  [3 marks]

[3 markah]

CLO 2

- (c) i. Determine the modulus and argument of the complex number
- $7 + 5i$

*Tentukan modulus dan argumen bagi nombor kompleks  $7 + 5i$* 

C3

[5 marks]

[5 markah]

- ii. Express
- $Z_1 = 4 + 5i$
- ,
- $Z_2 = 2(\cos 10^\circ + i \sin 10^\circ)$
- and
- $Z_3 = 4e^{0.35i}$
- in Polar

Form. Then, find  $\frac{Z_1 Z_3}{Z_2}$  in Polar Form.*Nyatakan  $Z_1 = 4 + 5i$ ,  $Z_2 = 2(\cos 10^\circ + i \sin 10^\circ)$  dan  $Z_3 = 4e^{0.35i}$  dalam**bentuk Polar . Seterusnya, cari  $\frac{Z_1 Z_3}{Z_2}$  dalam bentuk Polar .*

[10 marks]

[10 markah]

**QUESTION 4****SOALAN 4**

- CLO 2 (a) Find the derivative for each of the following functions:

*Cari perbezaan bagi setiap fungsi yang berikut:*

i)  $y = 4x$

ii)  $y = 2x^5$

iii)  $y = x^{-8}$

iv)  $y = 0$

[4 marks]

[4 markah]

- CLO 2 (b) Differentiate each of the following equations:

*Bezakan setiap persamaan berikut:*

i.  $y = 2(x + 3)^4$

[3 Marks]

[3 Markah]

ii.  $y = \frac{1}{(9-6x)^2}$

[3 Marks]

[3 Markah]

- CLO 3 (c) i. Solve the differentiation for :

*Selesaikan pembezaan bagi:*

a.  $y = (x + 1)(2x - 1)^3$

[5 marks]

[5 markah]

b.  $y = \frac{(-2x - 3)^3}{x^4}$

[5 marks]

[5 markah]

- ii. Solve the integration of  $\int_{-2}^{-1} \frac{x^6 - 2x^5 + 3x^2}{x^2} dx$

*Selesaikan kamiran  $\int_{-2}^{-1} \frac{x^6 - 2x^5 + 3x^2}{x^2} dx$*

[5 marks]

[5 markah]

**QUESTION 5****SOALAN 5**CLO3  
C1

- (a) Given matrix  $A = \begin{bmatrix} 3 & 10 & 5 \\ -2 & 5 & 6 \\ 12 & 8 & 6 \end{bmatrix}$ , state the element of :

*Diberi matriks  $A = \begin{bmatrix} 3 & 10 & 5 \\ -2 & 5 & 6 \\ 12 & 8 & 6 \end{bmatrix}$ , nyatakan unsur bagi:*

- i.  $a_{21}$  [4 marks]
- ii.  $a_{13}$
- iii.  $a_{32}$
- iv.  $a_{22}$  [4 markah]

CLO3  
C2

- (b) Given the matrices  $A = \begin{bmatrix} 3 & -2 & 1 \\ 4 & 2 & 5 \end{bmatrix}$ ,  $B = \begin{bmatrix} 0 & 2 & 2 \\ 3 & -2 & 1 \end{bmatrix}$  and  $C = \begin{bmatrix} 2 & 4 \\ 3 & 0 \\ 1 & 5 \end{bmatrix}$ .

Calculate :

*Di beri matrik  $A = \begin{bmatrix} 3 & -2 & 1 \\ 4 & 2 & 5 \end{bmatrix}$ ,  $B = \begin{bmatrix} 0 & 2 & 2 \\ 3 & -2 & 1 \end{bmatrix}$  dan  $C = \begin{bmatrix} 2 & 4 \\ 3 & 0 \\ 1 & 5 \end{bmatrix}$ .*

*Hitungkan:*

- i.  $(A + B)^T$  [3 marks]  
[3 markah]
- ii.  $(B \cdot C)^T$  [3 marks]  
[3 markah]

CLO3  
C2

- (c) Solve the following equation using Cramer's rule.

*Selesaikan persamaan berikut menggunakan petua Cramer.*

$$5p - q + 7r = 4$$

$$6p - 2q + 9r = 5$$

$$2p + 8q - 4r = 8$$

[15 marks]

[15 markah]

**SOALAN TAMAT**

## FORMULA SHEET FOR DBM 1023 – MATHEMATICS FOR COMPUTING

CIRCLELength of an arc

1.  $s = r\theta$

Area of a sector , Area of a segment

1.  $A = \frac{1}{2}r^2\theta$

1.  $A = \frac{1}{2}r^2(\theta - \sin \theta)$

SURFACE AREA AND VOLUME

1. Cylinder :  $A = 2\pi rh + 2\pi r^2$  ,  $V = \pi r^2 h$

3. Sphere :  $A = 4\pi r^2$  ,  $V = \frac{4}{3}\pi r^3$

2. Cone :  $A = \pi rs + \pi r^2$  ,  $V = \frac{1}{3}\pi r^2 h$

4. Pyramid :  $A = \text{area of 4 triangles} + \text{area of base}$

$$V = \frac{1}{3} \times \text{area of base} \times \text{height}$$

COMPLEX NUMBERModulus

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

Argument

1.  $\arg z = \tan^{-1} \frac{b}{a}$

Complex no. In other form

1. Polar form :  $|z| \angle \theta$

2. Exponential form :  $|z| e^{i\theta}$

3. Trigonometric form :  $|z| (\cos \theta + i \sin \theta)$

Multiplication & Division

1.  $(a \angle \theta_a) \cdot (b \angle \theta_b) = (ab) \angle (\theta_a + \theta_b)$

2.  $\frac{(a \angle \theta_a)}{(b \angle \theta_b)} = \left(\frac{a}{b}\right) \angle (\theta_a - \theta_b)$

MATRIXInverse Matrix

1.  $A^{-1} = \frac{1}{|A|} adj A$

Cramer's Rule

1.  $x = \frac{|A_1|}{|A|}$   $y = \frac{|A_2|}{|A|}$   $z = \frac{|A_3|}{|A|}$

DIFFERENTIATION

$y = ax^n$   $y = (ax + b)^n$

1.  $\frac{dy}{dx} = anx^{n-1}$  2.  $\frac{dy}{dx} = an(ax + b)^{n-1}$

3. Chain Rule :  $\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$

4. Product Rule :  $y = u \times v$

$y' = uv' + vu'$

5. Quotient Rule :  $y = \frac{u}{v}$   
 $y' = \frac{vu' - uv'}{v^2}$

INTEGRATIONIndefinite Integration

1.  $\int x^n dx = \frac{x^{n+1}}{n+1} + C$

2.  $\int (ax + b)^n dx = \frac{(ax + b)^{n+1}}{a(n+1)} + C$

Definite Integration

1.  $\int_a^b f(x) dx = F(b) - F(a)$

