

SULIT



BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK
KEMENTERIAN PENDIDIKAN TINGGI

JABATAN MATEMATIK, SAINS & KOMPUTER

PEPERIKSAAN AKHIR
SESI DISEMBER 2017

PBM2014 : BASIC MATHEMATICS 2

TARIKH : 31 MAC 2018
MASA : 2.30 PETANG - 4.30 PETANG (2 JAM)

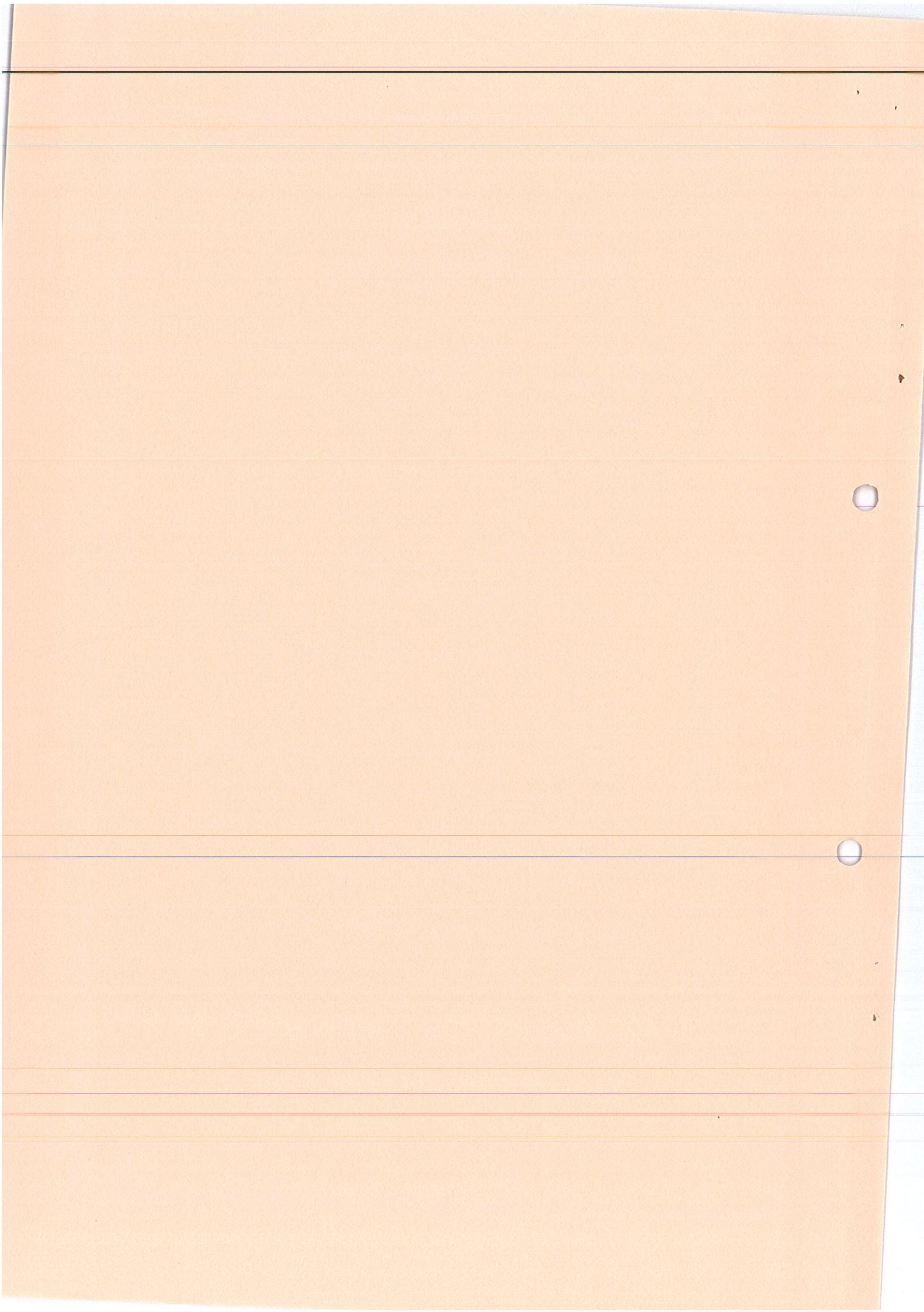
Kertas ini mengandungi **SEBELAS (11)** halaman bercetak.
Bahagian A: Struktur (2 soalan)
Bahagian B: Struktur (3 soalan)

Dokumen sokongan yang disertakan : Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT



SECTION A : 50 MARKS
BAHAGIAN A : 50 MARKAH

INSTRUCTION:

This section consists of **TWO (2)** structured questions. Answer **ALL** questions.

ARAHAN:

Bahagian ini mengandungi **DUA (2)** soalan berstruktur. Jawab **SEMUA** soalan.

QUESTION 1**SOALAN 1**

CLO1

C2

(a) Based on Figure A1(a), find:

Merujuk kepada Rajah A1(a), cari:

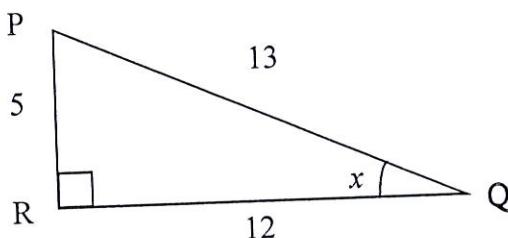


Figure A1(a) / Rajah A1(a)

- i. $\cos x$ [2 marks]
[2 markah]
- ii. $\tan x$ [2 marks]
[2 markah]
- iii. $\sec x$ [3 marks]
[3 markah]
- iv. $\cot x$ [3 marks]
[3 markah]

CLO1
C3

- (b) Find the reference angle and calculate the trigonometric functions;

Cari sudut rujukan dan kirakan fungsi trigonometri;

i. $\sin 240^\circ$

[5 marks]
[5 markah]

ii. $\tan 320^\circ$

[5 marks]
[5 markah]CLO1
C3

- (c) Refer to Figure A1(c) and calculate the angle of RPQ.

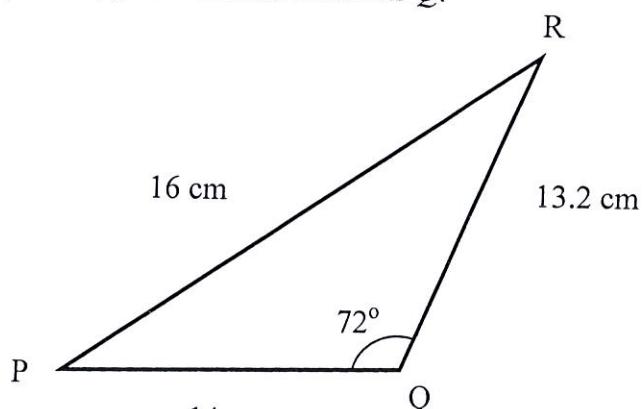
Merujuk pada Rajah A1(c) dan kirakan sudut RPQ.

Figure A1(c) / Rajah A1(c)

[5 marks]
[5 markah]

QUESTION 2
SOALAN 2

CLO1
C2

- (a) Solve the given questions;

Selesaikan soalan – soalan berikut;

- i. A sector of a circle with a radius of 7 cm has an area of 29.5 cm^2 . Find the angle of the sector of the circle in degrees.

Satu sektor bulatan yang berjejari 7 cm mempunyai keluasan 29.5 cm^2 . Cari nilai sudut bagi sektor bulatan dalam unit darjah.

[5 marks]
[5 markah]

- ii. Find the radius of a sector if the angle subtended at the centre of the circle is 55° and its area is 12 cm^2 .

Cari panjang jejari bagi sektor yang mempunyai sudut 55° dan keluasan 12 cm^2 .

[5 marks]
[5 markah]

CLO1
C3

- (b) Figure A2(b) below shows a circle with a diameter of 16 cm and has a sector OAB, calculate;

Rajah A2(b) di bawah menunjukkan satu bulatan dengan garis pusat 16 cm dan mempunyai sektor OAB, kirakan;

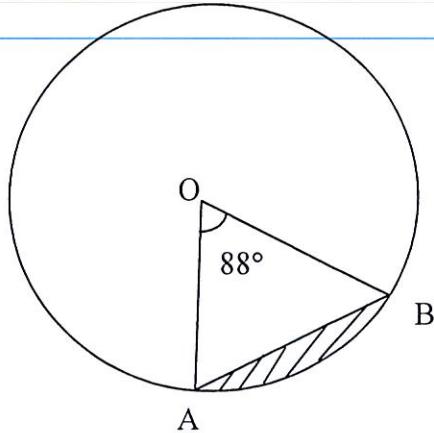


Figure A2(b) / Rajah A2(b)

- i. Circumference of the circle

Lilitan bulatan

[3 marks]

[3 markah]

- ii. Length of minor arc AB

Panjang lengkok minor AB

[3 marks]

[3 markah]

- iii. Area of the shaded region

Luas kawasan berlorek

[4 marks]

[4 markah]

CLO1
C3

- (c) Figure A2(c) below shows a sector OPQ with a radius of 9 cm and an angle of 1.2 radian. Calculate the area of the triangle OPQ.

Rajah A2(c) di bawah menunjukkan satu sektor OPQ dengan jejari 9 cm dan sudut 1.2 radian. Kirakan luas segitiga OPQ.

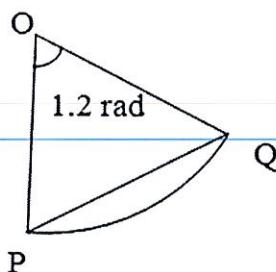


Figure A2(c) / Rajah A2(c)

[5 marks]

[5 markah]

SECTION B: 50 MARKS
BAHAGIAN B: 50 MARKAH

INSTRUCTION:

This section consists of THREE (3) questions, answer only TWO (2) questions.

ARAHAN:

Bahagian ini mengandungi **TIGA (3)** soalan, jawab hanya **DUA (2)** soalan sahaja.

QUESTION 3**SOALAN 3**

CLO2
C2

- (a) i. State **TWO (2)** types of Vectors.

*Nyatakan **DUA (2)** jenis Vektor.*

[2 marks]
[2 markah]

- ii. Sketch a directed line segment to represent vector $\vec{A} = \begin{pmatrix} 3 \\ 3 \end{pmatrix}$.

Lakarkan garisan yang menunjukkan vektor $\vec{A} = \begin{pmatrix} 3 \\ 3 \end{pmatrix}$.

[2 marks]
[2 markah]

- iii. The diagram below shows the vector in a Cartesian Plane. State the vector of

\overrightarrow{OA} in $xi + yj$ form.

Rajah di bawah menunjukkan vektor dalam Rajah Cartesian. Nyatakan vektor \overrightarrow{OA} dalam bentuk $xi + yj$.

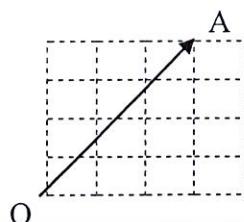


Figure B3(a)/ Rajah B3(a)

[2 marks]
[2 markah]

iv. Calculate the magnitude of the given vectors.

Kirakan magnitud bagi vektor yang diberi.

a. $a = 4\mathbf{i} + 7\mathbf{j}$

b. $\overrightarrow{OB} = 5\mathbf{i} - 2\mathbf{j}$

[4 Marks]
[4 markah]

CLO2
C3

(b) i. Given $\vec{x} = -5\mathbf{i} + 3\mathbf{j}$ and $\vec{y} = 4\mathbf{i} - 6\mathbf{j}$. Find the value of :

Diberi $\vec{x} = -5\mathbf{i} + 3\mathbf{j}$ dan $\vec{y} = 4\mathbf{i} - 6\mathbf{j}$. Dapatkan nilai berikut :

a. $\vec{x} + \vec{y}$

b. $\vec{x} - \vec{y}$

c. $2\vec{y} - \vec{x}$

[6 Marks]
[6 markah]

ii. If $a = \mathbf{i} + 3\mathbf{j}$ and $b = 2\mathbf{i} + \mathbf{j}$. Calculate $3|a| + 2|b|$.

Jika $a = \mathbf{i} + 3\mathbf{j}$ dan $b = 2\mathbf{i} + \mathbf{j}$. Kirakan $3|a| + 2|b|$.

[4 Marks]
[4 markah]

CLO2
C3

(c) Given vectors $p = 2\mathbf{i} + \mathbf{j}$ and $q = \mathbf{i} - 3\mathbf{j}$. Find $p \cdot (p + q)$.

Diberi vektor $p = 2\mathbf{i} + \mathbf{j}$ dan $q = \mathbf{i} - 3\mathbf{j}$. Dapatkan $p \cdot (p + q)$

[5marks]
[5markah]

QUESTION 4
SOALAN 4CLO2
C2

- (a) i. State the following using mathematical symbols of inequalities.

a. x is greater than 2 x lebih besar dari 2b. y is less than 10 y kurang dari 10c. p is greater than 7 or equal to 7 p lebih besar dari 7 atau sama dengan 7d. q is less than 5 or equal to 5 q kurang dari 5 atau sama dengan 5[4 marks]
[4 markah]

- ii. Show the following linear inequalities on a numbered line:

Tunjukkan ketaksamaan linear berikut dalam bentuk garis nombor:

a. $x \geq 3$ and $x > 7$

[2 Marks]

[2 markah]

b. $-2 < x \leq 4$

[2 Marks]

[2 markah]

c. $-1 \leq x \leq 5$

[2 Marks]

[2 markah]

CLO2
C3

(b) Solve each of the inequalities below.

Selesaikan setiap ketaksamaan di bawah.

i. $\frac{3x}{5} \geq 9$

[3 Marks]
[3 markah]

ii. $2x - 9 < 3$

[3 Marks]
[3 markah]

iii. $\frac{8-2x}{8} \leq 5$

[4 Marks]
[4 markah]CLO2
C3

(c) Solve the inequalities :

Selesaikan ketaksamaan:

$$3 > 2 - p \quad \text{and} \quad 2p \leq 4$$

[5 Marks]
[5 markah]

SULIT

QUESTION 5
SOALAN 5

CLO2

C2

- (a) i. State **THREE (3)** types of matrices and give the examples.

*Nyatakan **TIGA(3)** jenis matrik dan berikan contoh.*

[6 marks]

[6 markah]

- ii. Given matrix $B = \begin{bmatrix} 3 & 2 & 0 \\ 7 & 2 & 5 \end{bmatrix}$. State the;

Diberi $B = \begin{bmatrix} 3 & 2 & 0 \\ 7 & 2 & 5 \end{bmatrix}$. Nyatakan;

- a. Number of rows

Bilangan baris

[1 mark]

[1 markah]

- b. Number of columns

Bilangan lajur

[1 mark]

[1 markah]

- c. Order of matrices B

Peringkat matriks B

[1 mark]

[1 markah]

- d. Elements of B_{22}

Elemen bagi B_{22}

[1 mark]

[1 markah]

CLO2
C3

(b) Given matrix $A = \begin{bmatrix} 1 & 0 & 7 \\ 2 & -1 & 0 \\ 0 & 6 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} -2 & 3 & 0 \\ 0 & -1 & 8 \\ 1 & 0 & -2 \end{bmatrix}$. Calculate:

Diberi matrik $A = \begin{bmatrix} 1 & 0 & 7 \\ 2 & -1 & 0 \\ 0 & 6 & -2 \end{bmatrix}$ *dan* $B = \begin{bmatrix} -2 & 3 & 0 \\ 0 & -1 & 8 \\ 1 & 0 & -2 \end{bmatrix}$. *Kirakan;*

i. $B - A$ [2 marks]
 [2 markah]

ii. $(B - A)^T$ [1 marks]
 [1 markah]

iii. $A + B$ [2 marks]
 [2 markah]

iv. $(A + B)^T$ [1 marks]
 [1 markah]

v. $2A + 2B$ [4 marks]
 [4 markah]

CLO2
C3

(c) Given $\begin{pmatrix} 1 & 2 \\ 3 & -5 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 4 \\ 1 \end{pmatrix}$. Determine the value of x and y using inverse matrix.

Diberikan $\begin{pmatrix} 1 & 2 \\ 3 & -5 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 4 \\ 1 \end{pmatrix}$. *Cari nilai bagi* x *dan* y *menggunakan matrik*
songsang.

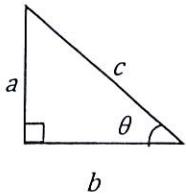
[5 marks]
 [5 markah]

SOALAN TAMAT

FORMULA SHEET FOR BASIC MATHEMATICS 2 (PBM2014)

TRIGONOMETRY

Pythagoras' Theorem



$$1. \quad c^2 = a^2 + b^2$$

reciprocal function

$$2. \quad \tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$3. \quad \operatorname{cosec} \theta = \frac{1}{\sin \theta}$$

$$4. \quad \sec \theta = \frac{1}{\cos \theta}$$

$$5. \quad \cot \theta = \frac{1}{\tan \theta}$$

Formula of Triangle

6. Sine Rules;

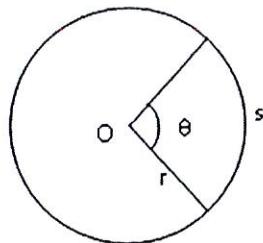
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

7. Cosine Rules;

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$8. \quad \text{Area of Triangle} = \frac{1}{2} a b \sin C$$

CIRCULAR MEASURE



$$1. \quad \text{Arc Length of a Circle;} \\ s = r\theta$$

$$2. \quad \text{Area of a Sector;}$$

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

$$3. \quad \text{Area of a triangle;} \\ A = \frac{1}{2} r^2 \sin \theta$$

$$4. \quad \text{Area of a Segment;} \\ A = \frac{1}{2} r^2 \theta - \frac{1}{2} r^2 \sin \theta$$

VECTOR

$$1. \quad \vec{A} \bullet \vec{B} = a_1 a_2 + b_1 b_2 + c_1 c_2$$

$$2. \quad \cos \theta = \frac{\vec{A} \bullet \vec{B}}{|A||B|}$$

$$3. \quad |\vec{A}| = \sqrt{x^2 + y^2}$$

MATRIX

Inverse Matrix;

$$A^{-1} = \frac{1}{ad - bc} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$$

