

SULIT

3472/2

3472/2
Additional
Mathematics
Kertas 2
Ogos
2008
2 ½ jam



JABATAN PELAJARAN TERENGGANU

**PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA
TAHUN 2008**

ADDITIONAL MATHEMATICS

Kertas 2

Dua jam tiga puluh minit

DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO

1. *This question paper consists of three sections : Section A, Section B and Section C.*
2. *Answer all questions in Section A, four questions from Section B and all question from Section C.*
3. *Give only one answer to each question.*
4. *Show your working. It may help you to get marks.*
5. *The diagrams in the questions provided are not drawn to scale unless stated.*
6. *The marks allocated for each question and sub-part of a question are shown in brackets.*
7. *A list of formulae is provided on pages 2 to 4.*
8. *You may use a non-programmable scientific calculator and a four-figure mathematical table.*

This question paper consists of 19 printed pages.

The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used.

Rumus-rumus berikut boleh membantu anda menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunakan.

ALGEBRA

$$1. x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$2. a^m \times a^n = a^{m+n}$$

$$3. a^m \div a^n = a^{m-n}$$

$$4. (a^m)^n = a^{m \cdot n}$$

$$5. \log_a mn = \log_a m + \log_a n$$

$$6. \log_a \frac{m}{n} = \log_a m - \log_a n$$

$$7. \log_a m^n = n \log_a m$$

$$8. \log_a b = \frac{\log_c b}{\log_c a}$$

$$9. T_n = a + (n-1)d$$

$$10. S_n = \frac{n}{2} \{2a + (n-1)d\}$$

$$11. T_n = ar^{n-1}$$

$$12. S_n = \frac{a(r^n - 1)}{r - 1} = \frac{a(1 - r^n)}{1 - r}, \quad r \neq 1$$

$$13. S_\infty = \frac{a}{1 - r}, \quad |r| < 1$$

CALCULUS / KALKULUS

$$1. y = uv$$

$$\frac{dy}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$$

$$2. y = \frac{u}{v}, \quad \frac{dy}{dx} = \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v^2}$$

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

$$4. \text{Area under a curve}$$

Luas di bawah lengkung

$$= \int_a^b y \, dx \quad \text{or / atau}$$

$$= \int_a^b x \, dy$$

$$5. \text{Volume generated}$$

Isipadu janaan

$$= \int_a^b \pi y^2 \, dx \quad \text{or / atau}$$

$$= \int_a^b \pi x^2 \, dy$$

STATISTICS / STATISTIK

1. $\bar{x} = \frac{\sum x}{N}$

2. $\bar{x} = \frac{\sum fx}{\sum f}$

3. $\sigma = \sqrt{\frac{\sum (x - \bar{x})^2}{N}} = \sqrt{\frac{\sum x^2}{N} - \bar{x}^2}$

4. $\sigma = \sqrt{\frac{\sum f(x - \bar{x})^2}{\sum f}} = \sqrt{\frac{\sum fx^2}{\sum f} - \bar{x}^2}$

5. $m = L + \left(\frac{\frac{1}{2}N - F}{f_m} \right) C$

6. $I = \frac{Q_1}{Q_0} \times 100$

7. $\bar{I} = \frac{\sum W_i I_i}{\sum W_i}$

8. ${}^n P_r = \frac{n!}{(n-r)!}$

9. ${}^n C_r = \frac{n!}{(n-r)! r!}$

10. $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

11. $p(X=r) = {}^n C_r p^r q^{n-r}, p+q=1$

12. Mean / Min = np

13. $\sigma = \sqrt{npq}$

14. $Z = \frac{X - \mu}{\sigma}$

GEOMETRI (GEOMETRY)

1. Distance / Jarak

$$= \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

2. Midpoint / Titik tengah

$$(x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

3. A point dividing a segment of a line
Titik yang membahagi suatu tembereng garis

$$(x, y) = \left(\frac{nx_1 + mx_2}{m+n}, \frac{ny_1 + my_2}{m+n} \right)$$

4. Area of triangle / Luas segi tiga

$$\frac{1}{2} |(x_1 y_2 + x_2 y_3 + x_3 y_1) - (x_2 y_1 + x_3 y_2 + x_1 y_3)|$$

5. $|r| = \sqrt{x^2 + y^2}$

6. $\hat{r} = \frac{x\mathbf{i} + y\mathbf{j}}{\sqrt{x^2 + y^2}}$

TRIGONOMETRY / TRIGONOMETRI

1. Arc length, $s = r\theta$
Panjang lengkok, $s = j\theta$
2. Area of sector $= \frac{1}{2} r^2 \theta$
Luas sektor, $L = \frac{1}{2} j^2 \theta$
3. $\sin^2 A + \cos^2 A = 1$
 $\sin^2 A + \text{kos}^2 A = 1$
4. $\sec^2 A = 1 + \tan^2 A$
 $\text{sek}^2 A = 1 + \tan^2 A$
5. $\text{cosec}^2 A = 1 + \cot^2 A$
 $\text{kosek}^2 A = 1 + \text{kot}^2 A$
6. $\sin 2A = 2 \sin A \cos A$
 $\sin 2A = 2 \sin A \text{kos} A$
7. $\cos 2A = \cos^2 A - \sin^2 A$
 $= 2 \cos^2 A - 1$
 $= 1 - 2 \sin^2 A$
 $\text{kos } 2A = \text{kos}^2 A - \sin^2 A$
 $= 2 \text{kos}^2 A - 1$
 $= 1 - 2 \sin^2 A$
8. $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$
 $\sin(A \pm B) = \sin A \text{kos} B \pm \text{kos} A \sin B$
9. $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$
 $\text{kos}(A \pm B) = \text{kos} A \text{kos} B \mp \sin A \sin B$
10. $\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$
11. $\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$
12. $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$
13. $a^2 = b^2 + c^2 - 2bc \cos A$
 $a^2 = b^2 + c^2 - 2bc \text{kos} A$
14. Area of triangle / *Luas segi tiga*
 $= \frac{1}{2} ab \sin C$

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HALAMAN KOSONG**

SECTION A / BAHAGIAN A

[40 marks / 40 markah]

Answer **all** questions in this section.
 Jawab **semua** soalan dalam bahagian ini.

- 1 Solve the simultaneous equations $2y = x - 2$ and $\frac{x}{y} + \frac{5y}{x} = 5$. Give your answers correct to two decimal places. [5 marks]

Selesaikan persamaan serentak $2y = x - 2$ dan $\frac{x}{y} + \frac{5y}{x} = 5$. Beri jawapan anda betul kepada dua tempat perpuluhan. [5 markah]

- 2 Given that $h = 2x - 5$ and $y = -\frac{4}{h^2}$, find

Diberi $h = 2x - 5$ dan $y = -\frac{4}{h^2}$, cari

- (a) $\frac{dy}{dx}$ in terms of x , [3 marks]
 $\frac{dy}{dx}$ dalam sebutan x , [3 markah]
- (b) the rate of change of x when h changes at a rate of 4 units s^{-1} , [2 marks]
 kadar perubahan bagi x apabila kadar perubahan bagi h ialah 4 unit s^{-1} [2 markah]
- (c) the small change in y when x decreases from 2 to 1.98. [3 marks]
 perubahan kecil dalam y apabila x menyusut dari 2 kepada 1.98. [3 markah]

Score/ Markah	Numbers of students/ Bilangan pelajar
1-10	2
11-20	5
21-30	6
31-40	m
41-50	3

Table 1 / Jadual 1

- 3 Table 1 shows the frequency distribution of the scores of a group of students in a contest. Given that the mean score of the distribution is 26. Calculate

Jadual 1 menunjukkan taburan kekerapan bagi skor sekumpulan murid dalam suatu pertandingan. Diberi bahawa skor min bagi taburan itu ialah 26. Hitung

- (a) the value of m , [3 marks]
nilai m , [3 markah]
- (b) the standard deviation of the scores of the students. [3 marks]
sisihan piawai bagi skor pelajar itu. [3 markah]

- 4 (a) Prove that $\tan^2 x + 2 \cos^2 x - \sec^2 x = \cos 2x$. [2 marks]
Buktikan bahawa $\tan^2 x + 2 \cos^2 x - \sec^2 x = \cos 2x$. [2 markah]

- (b) (i) Sketch the graph of $y = 3 \cos 2x - 1$ for $0 \leq x \leq 2\pi$.
Lakarkan graf $y = 3 \cos 2x - 1$ untuk $0 \leq x \leq 2\pi$.

- (ii) Hence, using the same axes, sketch a suitable straight line to find the number of solutions to the equation $3(\tan^2 x + 2 \cos^2 x - \sec^2 x) = \frac{x}{\pi} - 2$ for $0 \leq x \leq 2\pi$.

[6 marks]

Seterusnya, dengan menggunakan paksi yang sama, lakarkan garis lurus yang sesuai untuk mencari bilangan penyelesaian kepada persamaan

$$3(\tan^2 x + 2 \cos^2 x - \sec^2 x) = \frac{x}{\pi} - 2 \text{ untuk } 0 \leq x \leq 2\pi.$$

[6 markah]

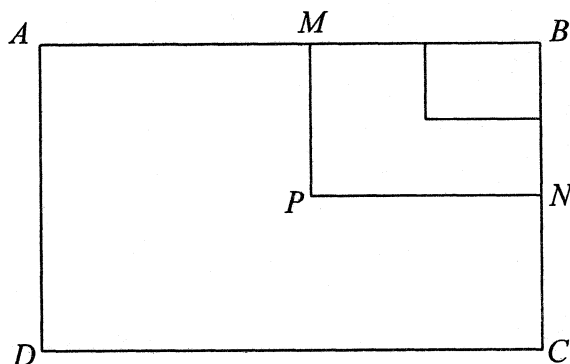


Diagram 1 / Rajah 1

- 5 Diagram 1 shows a rectangular geometric pattern. The first rectangle is $ABCD$ and followed by $MBNP$ and so on. The length and width of the next rectangle is half from the length and width of the previous rectangle. Given that $AB = 30$ cm and $BC = 20$ cm, find

Rajah 1 menunjukkan corak geometri segi empat tepat. Segi empat tepat pertama yang dilukis ialah $ABCD$ diikuti dengan $MBNP$ dan seterusnya. Panjang sisi bagi segi empat tepat yang berikutnya adalah separuh daripada panjang sisi segi empat tepat sebelumnya. Diberi bahawa $AB = 30$ cm and $BC = 20$ cm, cari

- (a) the perimeter of the 7th rectangle, [3 marks]
perimeter segi empat tepat ke-7, [3 markah]
- (b) the number of rectangles needed to be drawn until the area is less than 20 cm² for the first time. [4 marks]
bilangan segi empat tepat yang perlu dilukis sehingga luasnya kurang dari 20 cm² buat kali pertamanya. [4 markah]

- 6 In Diagram 2, E and F are midpoints of BC and AB respectively. Given that $\vec{AC} = \underline{a}$, $\vec{CB} = \underline{b}$ and CF is produced to D such that $CF = \frac{3}{4} CD$.

Dalam Rajah 2, E dan F adalah titik tengah bagi BC dan AB masing-masing. Diberi bahawa $\vec{AC} = \underline{a}$, $\vec{CB} = \underline{b}$ dan CF diperpanjangkan ke D supaya $CF = \frac{3}{4} CD$.

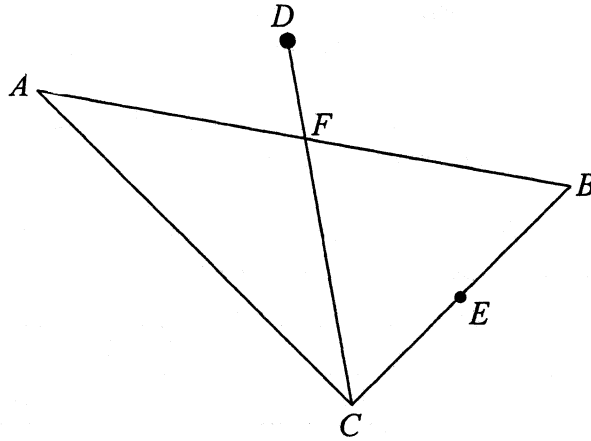


Diagram 2 / Rajah 2

- (a) Express

Ungkapkan

(i) \vec{AE} ,

(ii) \vec{EF} ,

(ii) \vec{DB} ,

in terms of \underline{a} and \underline{b} .

[5 marks]

dalam sebutan \underline{a} dan \underline{b} .

[5 markah]

- (b) Hence, show that \vec{AE} is parallel to \vec{DB} .

[2 marks]

Seterusnya, tunjukkan bahawa \vec{AE} adalah selari dengan \vec{DB} .

[2 markah]

