SULIT **3472/1**

3472/1
Form Five
Additional Mathematics
Paper 1
September 2007
2 hours

NO.KAD PENGENALAN/I.C NUMBER

						-			-				

ANGKA GILIRAN/INDEX NUMBER

Nama Calon :
Tingkatan :

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2007

ADDITIONAL MATHEMATICS
Paper 1
2 hours

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tuliskan **angka giliran** dan **nombor kad pengenalan** anda pada ruang yang disediakan.*

   Write your **index number** and **I.C. number** in the space provided.

2. *Calon dikehendaki membaca arahan di halaman 2 dan halaman 3*

   Candidates are required to read the intructions on page 2 and 3

Examiner's Code		
Question	Full Marks	Marks Acquired
1	2	
2	4	
3	3	
4	3	
5	4	
6	3	
7	4	
8	4	
9	3	
10	3	
11	2	
12	4	
13	3	
14	3	
15	3	
16	4	
17	3	
18	2	
19	3	
20	3	
21	4	
22	3	
23	4	
24	3	
25	3	
Total	80	

Kertas soalan ini mengandungi **20** halaman bercetak.

SULIT **3472/1**

MAKLUMAT UNTUK CALON

1. *Kertas soalan ini mengandungi 25 soalan.*
2. *Jawab* **semua** *soalan.*
3. *Bagi setiap soalan berikan* **SATU** *jawapan sahaja.*
4. *Jawapan hendaklah ditulis dengan jelas dalam ruang yang disediakan dalam kertas soalan.*
5. *Tunjukkan langkah-langkah penting dalam kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.*
6. *Sekiranya anda hendak menukarkan jawapan, batalkan kerja mengira yang telah dibuat. Kemudian tuliskan jawapan yang baru.*
7. *Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.*
8. *Markah yang diperuntukkan bagi setiap soalan dan ceraian soalan ditunjukkan dalam kurungan.*
9. *Satu senarai rumus disediakan di halaman 4 hingga 6.*
10. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*
11. *Kertas soalan ini hendaklah diserahkan di akhir peperiksaan.*

INFORMATION FOR CANDIDATES

1. *This question paper consists of 25 questions.*
2. *Answer* **ALL** *questions.*
3. *Give only* **ONE** *answer for each question.*
4. *Write your answer clearly in the spaces provided in the question paper.*
5. *Show your working. It may help you to get marks.*
6. *If you wish to change your answer, cross out the work that you have done. Then write down the new answer.*
7. *The diagram in the questions provided are not drawn to scale unless stated.*
8. *The marks allocated for each question and sub-part of a question are shown in brackets.*
9. *A list of formulae is provided on pages 4 to 6.*
10. *You may use a non-programmable scientific calculator.*
11. *This question paper must be handed in at the end of the examination.*

ALGEBRA

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

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

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

4 $(a^m)^n = a^{mn}$

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

6 $\log_a \dfrac{m}{n} = \log_a m - \log_a n$

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

8 $\log_a b = \dfrac{\log_c b}{\log_c a}$

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

10 $S_n = \dfrac{n}{2}[2a + (n-1)d]$

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

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

13 $S_\infty = \dfrac{a}{1 - r}, |r| < 1$

CALCULUS

1 $y = uv, \quad \dfrac{dy}{dx} = u\dfrac{dv}{dx} + v\dfrac{du}{dx}$

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

3 $\dfrac{dy}{dx} = \dfrac{dy}{du} \times \dfrac{du}{dx}$

4 Area under a curve $= \int_a^b y\,dx$ *or* $\int_a^b x\,dy$

5 Volume generated $= \int_a^b \pi y^2\,dx$ or $= \int_a^b \pi x^2\,dy$

STATISTICS

1 $\bar{x} = \dfrac{\Sigma x}{N}$

2 $\bar{x} = \dfrac{\Sigma fx}{\Sigma f}$

3 $\sigma = \sqrt{\dfrac{\Sigma (x-\bar{x})^2}{N}} = \sqrt{\dfrac{\Sigma x^2}{N} - \bar{x}^2}$

4 $\sigma = \sqrt{\dfrac{\Sigma f(x-\bar{x})^2}{\Sigma f}} = \sqrt{\dfrac{\Sigma fx^2}{\Sigma f} - \bar{x}^2}$

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

6 $I = \dfrac{Q_1}{Q_0} \times 100$

7 $\bar{I} = \dfrac{\Sigma W_i I_i}{\Sigma W_i}$

8 ${}^nP_r = \dfrac{n!}{(n-r)!}$

9 ${}^nC_r = \dfrac{n!}{(n-r)!r!}$

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

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

12 Mean = np

13 $\sigma = \sqrt{npq}$

14 $Z = \dfrac{X - \mu}{\sigma}$

GEOMETRY

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

2 Midpoint = $\left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2} \right)$

3 A point dividing a segment of a line
(x , y) = $\left(\dfrac{nx_1 + mx_2}{m + n}, \dfrac{ny_1 + my_2}{m + n} \right)$

4 Area of a triangle =

$\dfrac{1}{2} \left| (x_1y_2 + x_2y_3 + x_3y_1) - (x_2y_1 + x_3y_2 + x_1y_3) \right|$

5. $\left| \underset{\sim}{r} \right| = \sqrt{x^2 + y^2}$

6 $\hat{\underset{\sim}{r}} = \dfrac{x\underset{\sim}{i} + y\underset{\sim}{j}}{\sqrt{x^2 + y^2}}$

TRIGONOMETRY

1 Arc length, $s = r\theta$

2 Area of a sector, $A = \frac{1}{2}r^2\theta$

3 . $\sin^2 A + \cos^2 A = 1$

4 $\sec^2 A = 1 + \tan^2 A$

5 $\text{cosec}^2 A = 1 + \cot^2 A$

6 $\sin 2A = 2 \sin A \cos A$

7 $\cos 2A = \cos^2 A - \sin^2 A$
$= 2\cos^2 A - 1$
$= 1 - 2\sin^2 A$

8 $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$

9 $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$

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

14 Area of triangle $= \frac{1}{2}ab\sin C$

Answer **all** *questions.*

$M = \{ -3, -2, -1, 0, 1, 2 \}$

$N = \{ -1, 0, 1, 2, 3 \}$

1 Based on the above information, the relation between M and N is defined by the set of ordered pairs $\{ (-2, 1), (-1, 0), (0, 1), (1, 2), (2, 3) \}$.

State

(a) the image of 2.
(b) the object of 0.

[*2 marks*]

1

Answer : (*a*).....

2

(*b*).....

---

2 Given that $f : x \to 3x - 4$ and $g : x \to x^2 + 8x + 16$, find

(a) $f^{-1}(5)$
(b) $gf(x)$

[*4 marks*]

2

4

Answer : (*a*).....

(*b*).....

3 -3 is one of the roots of the quadratic equation $2x^2 + px = 3$

Find

(*a*) the value of p

(*b*) the value of the other root.

[*3 marks*]

3

3

Answer : (*a*).....

(*b*).....

---

4. The quadratic equation $(2x - 5)^2 = (p - 10)x$ has two distinct roots.

Find the range of values of p.

[*3 marks*]

4

3

Answer : .....

5. Solve $\log_3(4x)+\log_3(x-1)=1$

[*4 marks*]

5

4

Answer : .....

---

6. Solve the equation $3^x=2$.

[*3 marks*]

6

3

Answer : .....

7. During the year 2005, a company increased its sales of digital cameras at a constant rate of 200 units per month. Thus the number of digital cameras sold in February was 200 more than in January, the number of digital cameras sold in March was 200 more than in February, and this pattern continued month by month throughout the year. Given that the company sold 38,400 units of digital cameras in the year 2005.

Calculate the number of units of digital cameras sold in

(*a*) January 2005

(*b*) December 2005

[*4 marks*]

7

4

Answer : (*a*).....

(*b*).....

---

8. The first three terms of a geometric progression are $x+10$, $x-2$ and $x-10$ respectively. Calculate

(a) the value of x.

(b) the sum to infinity of this progression.

[*4 marks*]

8

4

Answer : (*a*).....

(*b*).....

9. A point $P(8, t)$ divides the line joining $A(4, 1)$ and $B(r, 7)$ such that $3AP = 2PB$. Find the value of

(a) r

(b) t

[*3 marks*]

Answer : (*a*).....

(*b*).....

9

3

---

10. The straight lines $y = mx + 9$, where m is a constant, and $2y = x - 2$ are perpendicular.

(*a*) Find the value of m,

(*b*) Hence or otherwise, find the coordinates of the point of intersection of the lines.

[*3 marks*]

10

3

Answer : (*a*).....

(*b*).....

11 Diagram 1 shows vectors $\overrightarrow{CB}$ and $\overrightarrow{BA}$. A, B and C are (0, h), (5, 3) and (2, 7) respectively.

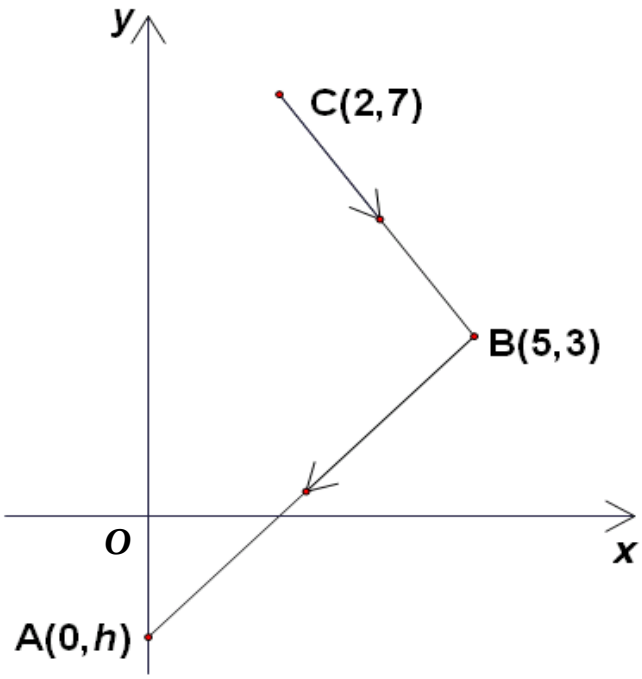

DIAGRAM 1

(a) Express $\overrightarrow{CB}$ in the form of $x\underset{\sim}{i} + y\underset{\sim}{j}$

(b) Given that $\overrightarrow{BA} = -5\underset{\sim}{i} - 7\underset{\sim}{j}$, find the corresponding value of h.

[*2 marks*]

11

2

Answer : (*a*).....

(*b*)... .....

12 Diagram 2 shows a parallelogram *ABCD* with *BED* as a straight line.

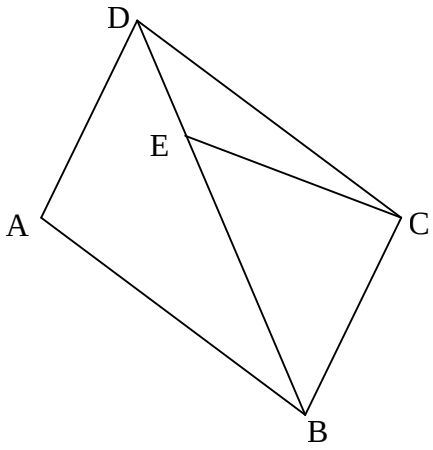

DIAGRAM 2

Given that $\overrightarrow{AB} = 5\boldsymbol{p}$, $\overrightarrow{BC} = 3\boldsymbol{q}$, and $4DE = EB$. Express in terms of $\boldsymbol{p}$ and $\boldsymbol{q}$:

(*a*) $\overrightarrow{BD}$

(*b*) $\overrightarrow{EC}$

[*4 marks*]

12

4

Answer : (*a*).....

(*b*)... .....

13. Given that $\underset{\sim}{a} = -2\underset{\sim}{i} + 2\underset{\sim}{j}$, $\underset{\sim}{b} = 2\underset{\sim}{i} - 3\underset{\sim}{j}$ and $\underset{\sim}{c} = \underset{\sim}{a} - 2\underset{\sim}{b}$. Find

(*a*) $\left| \underset{\sim}{c} \right|$

(*b*) unit vector in the direction of $\underset{\sim}{c}$.

[*3 marks*]

13

3

Answer : (*a*).....

(*b*)... .....

---

14. The net value, m in hundreds of ringgit, of the monthly output of a factory is modelled by $m = \frac{n^2}{10} - \frac{n^3}{3000}$ where n is the number of working hours a worker put in per month. Calculate the value of n such that m is maximum.

[*3 marks*]

14

3

Answer : n =.....

15 The radius of a spherical balloon is increasing at the rate of x cms^{-1}.
Given that the rate of change of the volume of the balloon is 25π $cm^3\ s^{-1}$ when its radius is 5 cm. Find the value of x. [$V = \frac{4}{3}\pi r^3$]

[*3 marks*]

15

3

Answer : .....

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16 x and y are related by the equation $x + \frac{m}{x} = ny$, where m and n are constants.
A straight line is obtained by plotting xy against x^2, as shown in Diagram 3.

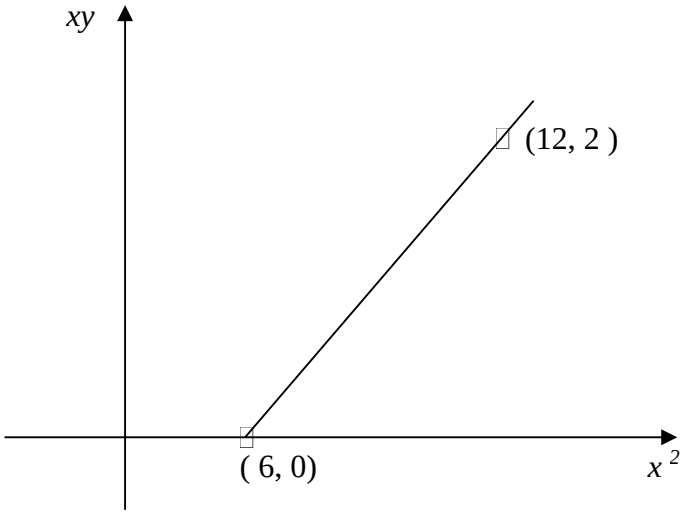

DIAGRAM 3

Calculate the value of m and of n.

[*4 marks*]

16

4

Answer : m=.....

n=.....

17 Given that $\int_1^5 g(x)dx = 5$, find the value of m if

$$\int_1^5 [mx - 2g(x)]\,dx = -3m$$

[*3 marks*]

17
3

Answer : .....

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18 Diagram 4 shows the quadratic curve $y = g(x)$ and the line PQ. PQ is parallel to the x-axis.

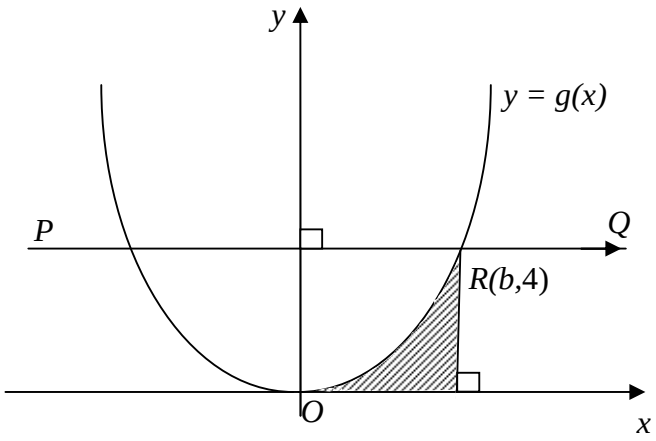

DIAGRAM 4

Given that the curve has a minimum value at O, the origin, the curve intersects line PQ at R $(b, 4)$. Given that the area of the shaded region is $\frac{1}{3}$.

Find $\int_{-b}^{b} -2g(x)dx$

[*2 marks*]

18
2

Answer : .....

[See overleaf

19 A circle of radius 2.5 cm has a minor sector with an area of 6.25 cm^2. Calculate

(*a*) the angle of the sector in radians,

(*b*) the perimeter of the major sector.

[use $\pi = 3.142$]

[*3 marks*]

Answer : (*a*).....

(*b*)... .....

19

3

---

20 Given that *x* is an acute angle and $\sin x = \frac{m}{n}$, find $1 + \tan(90^\circ - x)$ in terms of *m* and *n*.

[*3 marks*]

20

3

Answer : .....

21 Solve $3\cos 2x + 4\cos x + 1 = 0$ for $0^\circ \leq x \leq 360^\circ$

[*4 marks*]

21

4

Answer : .....

---

22 An expedition team consisting of 10 members to be chosen from a group of 4 teachers and 12 students.

(a) Calculate the number of teams that can be formed.

(b) If the team must consist of at least 2 teachers, calculate the numbers of teams that could be formed.

[*3 marks*]

22

3

Answer : (*a*).....

(*b*)… .....

23 (*a*) How many possible arrangements in a row, can all the letters from the word " **C E R I A** " be arranged ?

(*b*) An arrangement in (*a*) is chosen at random, find the probability that the arrangement will have both 'A' and 'E ' separated.

[*4 marks*]

Answer : (*a*).....

(*b*)... .....

23 | 4

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24 Diagram 5 shows a standard normal distribution graph.

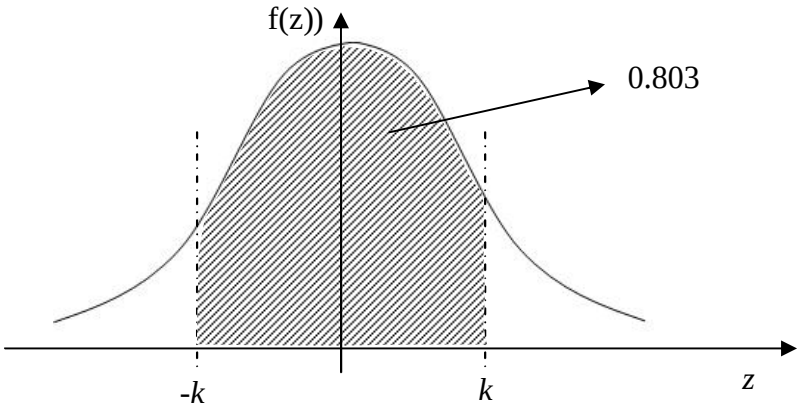

DIAGRAM 5

The probability represented by the area of the shaded region is 0.803.

(a) Find the value of P(Z > *k*)

(b) *X* is a continuous random variable which is normally distributed with a mean of μ and a standard deviation of 2. If the value of *X* is 85 when the Z-*score* is *k*, find the value of μ .

[*3 marks*]

Answer : (*a*).....

(*b*)... .....

24 | 3

25 In a survey, the probability that a family owning one unit of computer is 0.6. *N* families were selected at random. The standard deviation of the numbers of family owning one unit of computer is 1.697.

Find

(a) the value of *N*

(b) the mean of the numbers of family owning one unit of computer.

[*3 marks*]

25

3

Answer : (*a*)……

(*b*)… ……

END OF QUESTION PAPER