3472/1
Matematik Tambahan
Kertas 1
Ogos 2007
2 Jam

Name : ……..……

Form : ……..……

SEKTOR SEKOLAH BERASRAMA PENUH
KEMENTERIAN PELAJARAN MALAYSIA
PEPERIKSAAN PERCUBAAN SPM 2007

MATEMATIK TAMBAHAN
Kertas 1
Dua jam

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1 *This question paper consists of* **25** questions.

2. *Answer* **all** *questions.*

3. *Give only* **one** *answer for each question.*

4. *Write your answers 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 diagrams 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 2 to 3.*

10. *A booklet of four-figure mathematical tables is provided.*

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11 *You may use a non-programmable scientific calculator.*

12 *This question paper must be handed in at the end of the examination .*

For examiner's use only		
Question	**Total Marks**	**Marks Obtained**
1	3	
2	3	
3	3	
4	3	
5	3	
6	3	
7	3	
8	3	
9	4	
10	3	
11	4	
12	4	
13	4	
14	3	
15	2	
16	3	
17	4	
18	3	
19	3	
20	3	
21	3	
22	3	
23	3	
24	4	
25	3	
TOTAL	**80**	

Kertas soalan ini mengandungi 13 halaman bercetak

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

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 $(a^m)^n = a^{nm}$

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

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

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

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

GEOMETRY

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

2 Midpoint

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

3 $|r| = \sqrt{x^2 + y^2}$

4 $\hat{r} = \dfrac{xi + yj}{\sqrt{x^2 + y^2}}$

5 A point dividing a segment of a line

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

6 Area of triangle

$= \dfrac{1}{2} \left| (x_1 y_2 + x_2 y_3 + x_3 y_{1_1}) - (x_2 y_1 + x_3 y_2 + x_1 y_3) \right|$

STATISTIC

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

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

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

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

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

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

7 $\bar{I} = \dfrac{\sum w_1 I_1}{\sum w_1}$

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 $\mu = np$

13 $\sigma = \sqrt{npq}$

14 $z = \dfrac{x-\mu}{\sigma}$

TRIGONOMETRY

1 Arc length, $s = r\theta$

2 Area of sector , $L = \dfrac{1}{2}r^2\theta$

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

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

10 $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$

11 $\tan(A \pm B) = \dfrac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$

12 $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

13 $a^2 = b^2 + c^2 - 2bc\cos A$

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

For examiner's use only

Answer **all** *questions.*

1. Given set $A = \{9, 36, 49, 64\}$ and set $B = \{-8, -6, 3, 4, 6, 7, 8\}$. The relation from set A to set B is "the square root of ", state

(a) the range of the relation,

(b) the object of 8,

(c) the image of 49.

[3 *marks*]

Answer : (a) ……..

(b) ……...

(c).....

1

3

---

2. Given the function $f(x) = \frac{-3}{x}$, $x \neq 0$ and the composite function $gf(x) = 4x$. Find

(a) $g(x)$,

(b) the value of x when $gf(x) = 8$.

[3 *marks*]

Answer : (a) ……..

(b) ……...

2

3

3 Diagram 1 shows a function $f : x \to ax^2 + bx$.

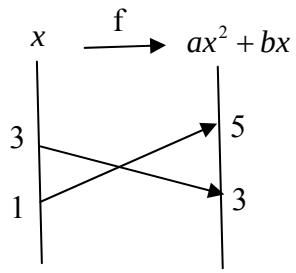

DIAGRAM 1

Find the value of a and of b. [3 *marks*]

3

3

Answer : .....

---

4 Solve the quadratic equation $2x(x-5) = (2-x)(x+3)$. Give your answer correct to four significant figures.

[3 *marks*]

4

3

Answer : .....

For examiner's use only

5 Given the roots of the quadratic equation of $4ax^2 + bx + 8 = 0$ are equal. Express a in terms of b.

[3 *marks*]

Answer : .....

5

3

---

6 Diagram 2 shows the graph of a quadratic function $f(x) = 3(x + p)^2 + 2$, where p is a constant. The curve $y = f(x)$ has the minimum point $(4, q)$, where q is a constant. State

(a) the value of p,

(b) the value of q,

(c) the equation of the axis of symmetry.

[*3 marks*]

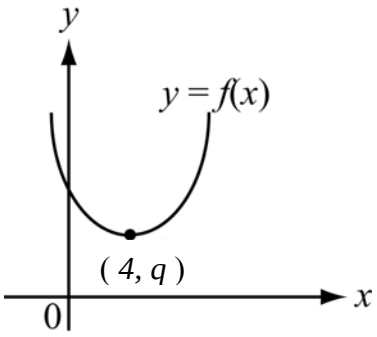

DIAGRAM 2

Answer : *(a)* …….....

(b) …….....

(c).....

6

3

For examiner's use only

7 Find the range of values of x for which $x(x-6) \leq 27$.

[3 *marks*]

7

3

Answer : .....

---

8. Solve the equation $81^{x+1} - 27^{2x-3} = 0$.

[3 *marks*]

8

3

Answer : .....

---

9. Given $\log_7 2 = h$ and $\log_7 5 = k$. Express $\log_7 2.8$ in terms of h and k.

[4 *marks*]

9

4

Answer : .....

For examiner's use only

10. Solve the equation $\log_3(3t+9) - \log_3 2t = 1$. [3 *marks*]

10

3

Answer : ....……...……..

---

11. The first three terms of an arithmetic progression are 6, $p-2$, 14,...….
Find

(a) the value of p,

(b) the sum of the first tenth term.

[4 *marks*]

11

Answer: a)…..……..…....

4

b) .....

For examiner's use only

12. The sum of the first *n* terms of the geometric progression 64, 32, 16, ….. is 126. Find

(a) the value of *n,*

(b) the sum to infinity of the geometric progression.

[4 *marks*]

12

4

Answer: a)…..……..…..…..

b) .....

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13. Diagram 3 shows a linear graph of $\frac{1}{y}$ against x^2.

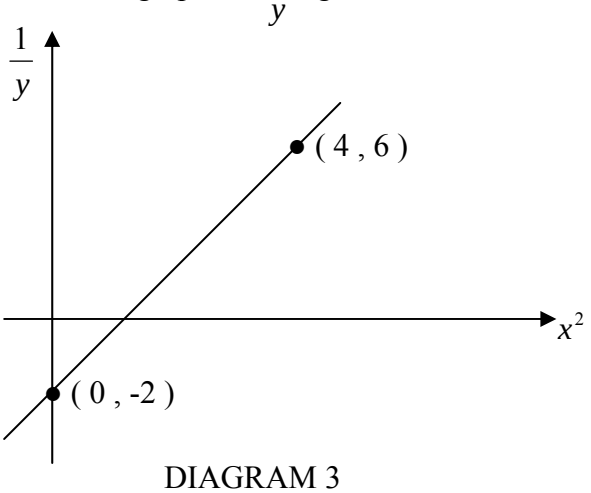

DIAGRAM 3

The variables x and y are related by the equation $\frac{p}{y} = 2x^2 + q$,

where p and q are constants.

a) determine the values of p and q ,

b) express y in terms of x .

[4 *marks*]

Answer : a) p = ……..…….

q = ……....…...

b) y = ….……....

13

4

For examiner's use only

14. Given that the point $P(-2,3)$ divides the line segment $A(-4,t)$ and $B(r,8)$ in the ratio $AP : PB = 1 : 4$, find the value of r and of t.

[3 *marks*]

14

3

Answer : .....

---

15 Given that $\underset{\sim}{x} = 9\underset{\sim}{i} - 8\underset{\sim}{j}$ and $\underset{\sim}{y} = 3\underset{\sim}{i}$, find $\left|\underset{\sim}{y} - \underset{\sim}{x}\right|$. [2 *marks*]

15

2

Answer : .....

  [Lihat sebelah SULIT

For examiner's use only

16 Diagram 4 shows the points $P(-5,-4)$ and $Q(3,-2)$.

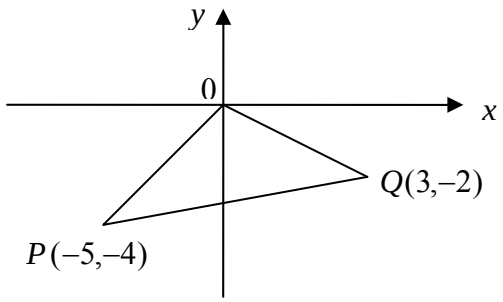

DIAGRAM 4

Find

a) $\overrightarrow{PQ}$ in terms of unit vector $\underset{\sim}{i}$ *and* $\underset{\sim}{j}$,

b) unit vector in the direction $\overrightarrow{PQ}$.

[3 *marks*]

16

3

Answer: a) $\overrightarrow{PQ}$ = ……..……...

b) ……..

17. Solve the equation $3\sin^2\theta + 5\cos\theta = 1$ for $0^0 \le \theta \le 360^0$. [4 *marks*]

17

4

Answer: …..……..…....

For examiner's use only

18. The diagram 5 shows a circle *PAQ* with centre *O*, of radius 8 cm. *SR* is an arc of a circle with center *O*. The reflex angle *POQ* is 1.6π radians.

[3 *marks*]

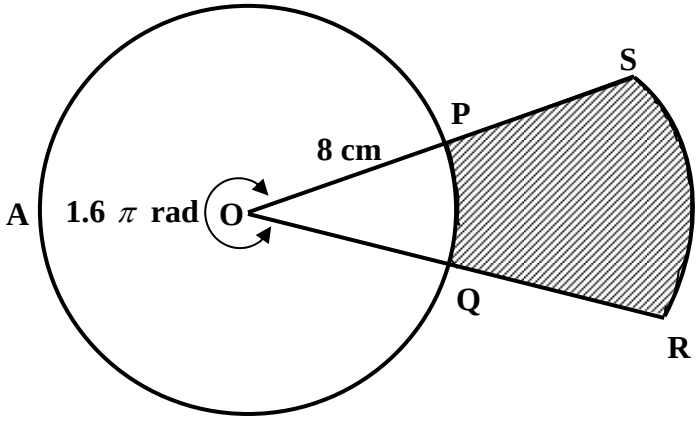

DIAGRAM 5

Given that *P* and *Q* are midpoints of *OS* and *OR* respectively, find the area of shaded region, giving your answer in terms of π.

Answer:…… cm^2

18

3

---

19. The radius of circle decreases at the rate of $0.5cms^{-1}$. Find the rate of change of the area when the radius is 4 *cm.*

[3 *marks*]

Answer:……

19

3

For examiner's use only

20. Given that $f(x) = \frac{3x+4}{3-x^2}$, find $f'(3)$. [3 *marks*]

20

3

Answer: …..……..…..…..

---

21. A set of numbers $x_1, x_2, x_3, x_4, ..., x_n$ has a median of 5 and a standard deviation of 2. Find the median and the variance for the set of numbers $6x_1 + 1, 6x_2 + 1, 6x_3 + 1, ..., 6x_n + 1$.

[3 *marks*]

21

3

Answer: median = ……..

variance =..……..……

---

22. A box contains 6 black balls and *p* white balls. If a ball is taken out randomly from the box, the probability to get a white ball is $\frac{4}{7}$. Find the value of *p*.

[3 *marks*]

22

3

Answer: *p* = ……..

For examiner's use only

23. 5% of the thermos flasks produced by a company are defective. If a sample of n thermos flasks is chosen at random, variance of the number of thermos flasks that are defective is 0.2375. Find the value of n.

[3 *marks*]

23

3

Answer: …..……..…..

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24. Given that the number of ways of selecting 2 objects from n different objects is 10, find the value of n. [4 *marks*]

24

Answer: ……

4

For examiner's use only

25. A the random variable X has a normal distribution with mean 50 and variance, σ^2. Given that P ($X > 51$) = 0.288, find the value of σ .

[3 *marks*]

25

3

Answer: …..……..…..

END OF QUESTION PAPER