

Name :

Form :



SMKA NAIM LILBANAT 15150 KOTA BHARU KELANTAN.
"SEKOLAH BERPRESTASI TINGGI"

PEPERIKSAAN PERCUBAAN SPM 2013
ADDITIONAL MATHEMATICS
Kertas 2
2 ½ Jam

3472/2

2 ½ Jam

Arahan:

1. This question paper consists of three sections: Section A, Section B and Section C.
2. Answer all questions in Section A, any four questions from Section B and any two questions from Section C.
3. Write your answers on the paper sheets provided.

Untuk Kegunaan Pemeriksa			
	Soalan	Markah Penuh	Markah Diperoleh
A	1	5	
	2	7	
	3	6	
	4	8	
	5	8	
	6	6	
B	7	10	
	8	10	
	9	10	
	10	10	
	11	10	
C	12	10	
	13	10	
	14	10	
	15	10	
	JUMLAH	100	

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Section A
[40 marks]
(Answer all questions)

1. Solve the simultaneous equations $y - 2x - 3 = 0$ and $x^2 - 2y^2 - xy + 27 = 0$
Give your answers correct to three decimal places. [5 marks]
2. (a) Sketch the graph of $y = 2 - 3\sin x$ for $0 \leq x \leq 2\pi$ [4 marks]
(b) By using the same axes, sketch a suitable straight line to find the number of the solutions of the equation $3\sin x - \frac{1}{\pi}x = 0$. [3 marks]

3. A curve has a gradient function $x^2 + kx + p$ with turning points $(2, 0)$ and $(-1, \frac{9}{2})$, where k and p are constants.
Find
(a) the value of k and of p . [3 marks]
(b) equation of curve. [3 marks]
4. Diagram 4 shows of n series of circle. The total of perimeter of all circle is 144π cm. Given the radius of smallest circle is 2cm and radius of the biggest circle is 16 cm. The arrangement of circles form a arithmetic progression.

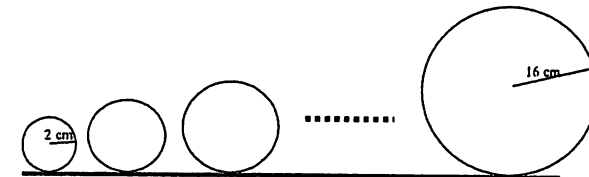


Diagram 4

- Find
- (a) the value of n , [3 marks]
 - (b) perimeter of the sixth circle in term of π , [3 marks]
 - (c) total perimeter for the first six circles in term of π [2 marks]

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5. Diagram 5 shows two triangles ABC and ABD. Point E lies on the straight line AD.

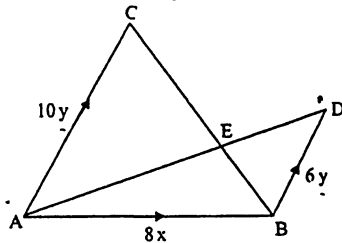


Diagram 5

It is given that $\vec{AC} = 10y$, $\vec{BD} = 6y$ and $\vec{AB} = 8x$

(a) Express in terms of x and y

- (i) \vec{AD}
- (ii) \vec{BC}

[2 marks]

(b) It is given that $\vec{AE} = m\vec{AD}$ and $\vec{EC} = k\vec{BC}$, Express \vec{AE} in terms of

- (i) m , x and y
- (ii) k , x and y

[3 marks]

(c) Hence, find the value of m and of k .

[3 marks]

6. The mean of set numbers k , $(k+1)$, $(2k-1)$, and $(2k+4)$ is 7.

(a) Find the value of k

[2 marks]

(b) Each number in the set is divided by 7 and then 1 added to it. Find

- (i) new mean
- (ii) the new standard deviation.

[4 marks]

3

Section B

[40 marks]

(Answer any four questions from this section)

7. Use graph paper to answer this question.

Table 7 shows the values of two variables, x and y , obtained from an experiment. It is known

that x and y are related by the equation $y = \frac{k}{x} + \frac{p}{x^2}$, where p and k are constants.

x	1.0	1.5	2.0	2.5	3.0	3.5
y	3.80	5.20	4.95	4.48	4.00	3.57

Table 7

(a) Plot xy against $\frac{1}{x}$ by using a scale to 2 cm to 0.2 units on $\frac{1}{x}$ -axis and 2 cm to 2 unit on xy -axis. Hence, draw the line of best fit.

[4 marks]

(b) Use the graph in 7(a) to find the value of

- (i) k and p .
- (ii) y when $x = 1.72$.

[6 marks]

8. Diagram 8 shows a part of curve $y = \frac{4}{(2x+1)^2}$ which passes through A (-1, 4)

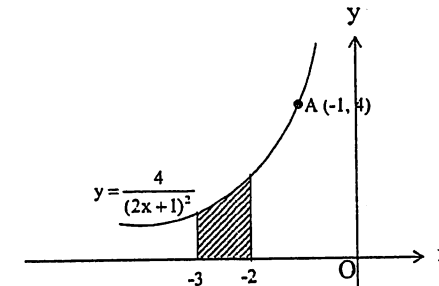


Diagram 8

(a) Find the equation of tangent at point A.

[4 marks]

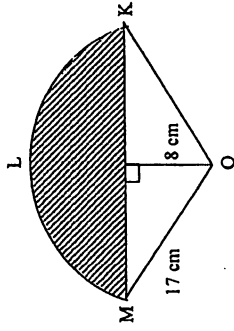
(b) The shaded region is bounded by x-axis, straight line $x = -3$ and $x = -2$.

- (i) Find the area of the shaded region..
- (ii) Find the volume revolution, in term of π , when the shaded region is rotated through 360° about the x -axis

[6 marks]

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10. In diagram 10, OKLM is a sector of circle with centre O and radius 17 cm.



Rajah 10

Calculate

- (a) $\angle MOK$, in radian [3 marks]
- (b) the perimeter, in cm, of the shaded region. [3 marks]
- (c) the area, in cm^2 , of the shaded region. [4 marks]

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9. Solution by scale drawing is not accepted.

Diagram 9 shows a trapezium ABCD. Given the equation of straight line DC is $3y - 2x = 2$

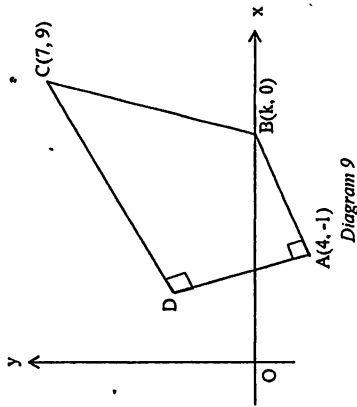


Diagram 9

Find,

- (a) the value of k [2 marks]
- (b) the equation of straight line AD. [2 marks]
- (c) coordinates of D [3 marks]
- (d) equation of the perpendicular bisector of AC. [3 marks]

11. (a) The result of a survey in an urban area shows the probability of a student having a mobile phone is k . The mean and variance of n students chosen at random having a mobile phone are 360 and 72 respectively.

Find the value of n and of k .

[5 marks]

(b) A group of worker are given medical check up. The blood pressure of the workers have a normal distribution with a mean of 140 mmHg and a standard deviation of 10 mmHg. Blood pressure that is more than 150 mmHg is classified as "high blood pressure"

- (i) A worker is chosen at random from the group. Calculate the probability that the worker has a blood pressure between 135 mmHg and 145 mmHg.
- (ii) It is found that 80 workers have "high blood pressure". Find the total number of workers in the group.

[5 marks]

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SECTION C
[20 marks]

(Answer any two questions from this section)

12. Diagram 12 shows a quadrilateral PQRS.

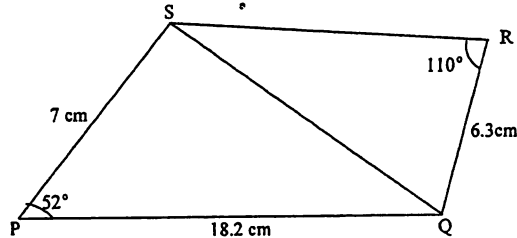


Diagram 12

- (a) Calculate
(i) the length, in cm, of QS
(ii) $\angle PQS$
[4 marks]

- (b) Point Q' lies on the QS such that Q'R = QR
(i) Sketch a triangle Q'RS
(ii) Calculate the area, in cm^2 , of triangle Q'RS
[6 marks]

13. Table 13 shows the price of four items P, Q, R and S in the year 2002 and year 2005. Price index and weightage for the year 2005 based on the year 2002.

Items	Price on 2002 (RM)	Price on 2005 (RM)	Price index for the year 2005 based 2002	weightage
P	6.00	7.20	120	4
Q	5.50	7.70	x	2
R	5.60	y	125	3
S	8.00	8.80	110	1

Table 13

- (a) Find the value of
(i) x
(ii) y
[2 marks]
- (b) Calculate the composite index of the price of those items for the year 2005 based on the year 2002.
[3 marks]

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- (c) The total cost of all items in the year 2002 is RM 9600. Calculate the corresponding cost of items in the year 2005.
[2 marks]

- (d) The price of items P and Q are increase by 10 % and the price of items R and S are increase by 5% fom the year 2005 to the year 2007. Find the composite index for the year 2007 based on the year 2002.
[3 marks]

14. Use graph paper to answer this question.

The member of a Naim's Teacher Club plan to organise a picnic. They agree to rent x bus and y van. The rental of a bus is RM 900 and the rental of a van is RM400. The rental of the vehicles for the trip is based on the following constrains.

- I : The total number of vehicles to be rented is not more than 9.
II : The number of bus is at most twice the number of vans.
III : The minimum allocation for the rental of the vehicles are RM3 600

- (a) Write three inequalities, other than $x \geq 0$ and $y \geq 0$, which satisfy all the above constrain.
[3 marks]
- (b) Using a scale of 2 cm to 1 vehicle on both axes, construck and shade the region R which satisfies all the above constrains.
[3 marks]
- (c) Using the graph constructed in 14(b), find
(i) the maximum number of van rented if 4 buses are rented.
(ii) the maximum number of members that can be accommodated into the rented vehicles if a bus can accommodate 45 passengers and a van can accommodate 20 passengers.
[4 marks]

15. A particle moves in a straight line and passes through a fixed point O. Its acceleration, $a \text{ ms}^{-2}$, given by $a = 2t - 8$, where t is the time, in s , after passing through O. The initial velocity is 12 ms^{-1} .

Find

- (a) the minimum velocity, in ms^{-1} , of the particle.
[4 marks]
- (b) the time, in s , at which the particle in instantaneously at rest.
[2 marks]
- (c) the total distance, in m , travelled by the particle in the first 4 seconds.
[4 marks]

SEK. MEN. KEB. AGAMA NAIMI LILBANAT
PEPERIKSAAN PERCUBAAN SPM 2013
SKEMA PERMALKAHAN MATEMATIK TAMBAHAN KERTAS 2

NO	SOLUTIONS	MARKS	TOTAL
1.	$y = 2x + 3$ or $x = \frac{y-3}{2}$ $x = \frac{y+4}{2}$ $x^2 - 2(2x+3)^2 - x(2x+3) + 27 = 0$ or $\left(\frac{y-3}{2}\right)^2 - 2y^2 - \left(\frac{y-3}{2}\right)y + 27 = 0$ $x^2 + 3x - 1 = 0$ or $y^2 = 13$ $x = \frac{-3 \pm \sqrt{3^2 - 4(1)(-1)}}{2(1)}$ or $y = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-28)}}{2(1)}$ $x = 0.303, -3.303$ (both) $y = 3.6060, -3.606$ (both)	P1 K1 K1	5
2(a)	<p>shape of sine curve P1 1 cycle for $0 \leq x \leq 2\pi$ P1 maximum = 5 and minimum = -1 P1</p>	N1 N1	7
3(a)	$\frac{dy}{dx} = x^2 + kx + p$ No. of solutions = 2	N1 K1 N1 N1	6

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(2,0): $4 + 2k + p = 0$ $(-1, \frac{9}{2}): 1 - k + p = 0$ $k = -1$ and $p = -2$	K1 N1	
$y = \int (x^2 - x - 2) dx$ $= \frac{x^3}{3} - \frac{x^2}{2} - 2x + c$ given $(2, 0)$ or $(-1, \frac{9}{2})$: $y = \frac{x^3}{3} - \frac{x^2}{2} - 2x + \frac{10}{3}$	K1 K1 N1	
4(a) $a = 2\pi(2) = 4\pi$ or $l = 2\pi(16) = 32\pi$ $S_n = \frac{n}{2} [4\pi + 32\pi] = 144\pi$ $n = 8$ $T_8 = 4\pi + 7d = 32\pi$ $d = 4\pi$ $T_6 = 4\pi + 5(4\pi) = 24\pi$ (c) $S_6 = \frac{6}{2} [2(4\pi) + 5(4\pi)] = 84\pi$	P1 K1 N1 K1 N1 N1 K1 N1	8
5(a) (i) $\vec{AD} = \vec{AB} + \vec{BD}$ $= 8x + 6y$ (ii) $\vec{BC} = \vec{BA} + \vec{AC}$ $= -8x + 10y$	N1 N1	