

SMK SEKSYEN 4 KOTA DAMANSARA
47810 PETALING JAYA
SELANGOR DARUL EHSAN

PEPERIKSAAN PERCUBAAN SPM 2013

MATEMATIK TAMBAHAN
KERTAS 1
TINGKATAN 5

2 Jam

JANGAN DIBUKA SOALAN INI SEHINGGA DIBERITAHU

Arahan :

- 1) Kertas soalan ini mengandungi 25 soalan.
- 2) Jawab semua soalan.
- 3) Tulis jawapan anda dalam ruangan yang disediakan dalam kertas soalan
- 4) Tunjukkan langkah-langkah penting dalam kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah
- 5) Sekiranya anda hendak menukar jawapan, batalkan jawapan yang telah dibuat.
- 6) Kemudian tulis jawapan yang baharu.
- 7) Rajah yang mengiringi masalah dalam kertas soalan ini dimaksudkan untuk memberi maklumat yang berguna bagi menyelesaikan masalah. Rajah tidak semestinya dilukis mengikut skala.
8. Markah yang diperuntukkan bagi setiap soalan ditunjukkan dalam kurungan
9. Satu senarai rumus disediakan di halaman 2 dan 3
10. Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram
11. Serahkan kertas soalan ini kepada pengawas peperiksaan di akhir peperiksaan

Lihat sebelah

Kertas soalan ini mengandungi 15 halaman bercetak termasuk muka hadapan

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CALCULUS KALKULUS

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

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

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

$$4 \quad \text{Area under a curve} \\ \text{Luas di bawah lengkung}$$

$$= \int_a^b y \, dx \text{ or (atau)}$$

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

$$5 \quad \text{Volume of revolution} \\ \text{Isi padu kisanan}$$

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

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

STATISTICS
STATISTIK

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

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

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

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

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

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

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

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

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

$$12 \quad \text{Mean / Min}, \mu = np$$

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

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

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

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

GEOMETRY
GEOMETRI

Distance / Jarak

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

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

Midpoint / Titik tengah

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

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

A point dividing a segment of a line

Titik yang membahagi suatu tembereng garis

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

Area of triangle / Luas segi tiga

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

[Lihat halaman sebelah
SULIT

TRIGONOMETRY
TRIGONOMETRI

1 Arc length, $s = r\theta$
Panjang lengkok, $s = j\theta$

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

*Answer all question
Jawab semua soalan*

[80 marks]

1. It is given that the relation between set $X = \{ 0, 1, 4, 9, 16 \}$ and set $Y = \{ 0, 1, 2, 3, 4, 5, 6 \}$ is 'square of'
Diberi bahawa hubungan antara set $X = \{ 0, 1, 4, 9, 16 \}$ dan set $Y = \{ 0, 1, 2, 3, 4, 5, 6 \}$ ialah kuasa dua bagi'
(a) Find the image of 9
Cari imej bagi 9.

- (b) Express the relation in the form of ordered pairs
Ungkapkan hubungan itu dalam bentuk pasangan tertib.

[2 marks]

Answer : (a)

(b)

-
2. The function f is defined by $f: x \rightarrow 2 - mx$ and $f^{-1}(8) = -2$, find the value of m .
Satu fungsi f ditakrifkan oleh $f: x \rightarrow 2 - mx$ dan $f^{-1}(8) = -2$, cari nilai m .

[3 marks]

Answer: $m = \dots\dots\dots$

3. Given $\frac{1}{4}$ and -3 are roots of a quadratic equation. State the quadratic equation in the form $ax^2 + bx + c = 0$, where a , b and c are integers.

Diberi $\frac{1}{4}$ dan -3 ialah punca-punca bagi suatu persamaan kuadratik. Nyatakan persamaan kuadratik itu dalam bentuk $ax^2 + bx + c = 0$, di mana a , b dan c adalah integer.

[3 marks]

Answer:

4. Find the range of values of where $2x \geq (2x - 5)(x + 3)$.
Cari julat nilai x dengan keadaan $2x \geq (2x - 5)(x + 3)$.

[3 marks]

Answer:.....

5. Solve the equation $5^x - \frac{1}{625} = 0$

Selesaikan persamaan $5^x - \frac{1}{625} = 0$

[2 marks]

Answer:

6. Given that $p = \log_r 3$, express $\log_5 135$ in terms p and q .

Diberi $p = \log_r 5$ dan $q = \log_r 3$, ungkapkan $\log_5 135$ dalam sebutan p dan q .

[3 marks]

Answer:

7. In an arithmetic progression, the n^{th} terms is given by $T_n = 5n - 2$

Dalam suatu jangjang aritmetik, sebutan ke- n diberi oleh $T_n = 5n - 2$

Calculate

Hitungkan

- (a) the first term,
sebutan pertama,

- (b) the sum of all terms from 5^{th} term to 20^{th} term.
hasil tambah sebutan kelima hingga sebutan kedua puluh.

[4 marks]

Answer : (a)

(b).....

8. Given that $1+k$, $1+3k$, $1+4k$, are three consecutive terms in a geometric progression, find the value of k .
Diberi $1+k$, $1+3k$, $1+4k$, ialah tiga sebutan berturut-turut dalam suatu jangjang geometri, cari nilai k

[3 marks]

Answer: $k = \dots\dots\dots$

-
9. The coordinates of R, S and T are $(-5, -2)$, $(1, 4)$ and $(3, 6)$ respectively. If the point S divides the straight line RST in the ratio $m : 1$, find the value of m .
Titik-titik R, S dan T masing-masing mempunyai koordinat $(-5, -2)$, $(1, 4)$ dan $(3, 6)$. Jika titik S membahagi garis lurus RST dengan nisbah $m : 1$, cari nilai m

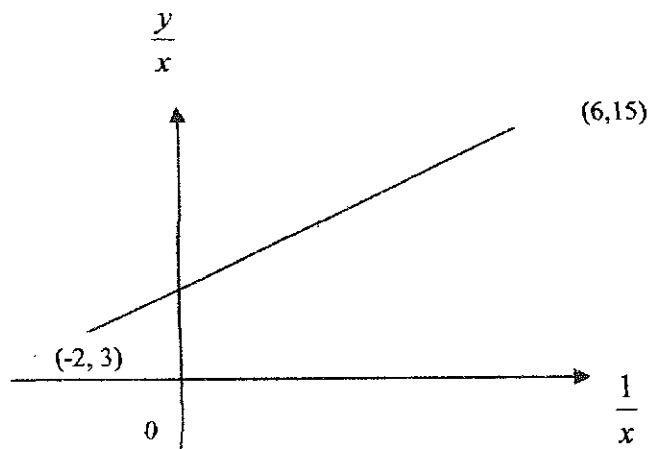
[2 marks]

Answer: $m = \dots\dots\dots$

-
- 10 Find the equation of the straight line perpendicular to the straight line $6x + 3y - 2 = 0$ and passes through the point $(6, -1)$.
Cari persamaan garis lurus yang berserenjang dengan garis lurus $6x + 3y - 2 = 0$ dan melalui titik $(6, -1)$

[4 marks]

Answer: $\dots\dots\dots$



11. The diagram above shows a straight line graph of $\frac{y}{x}$ against $\frac{1}{x}$. Express y in terms of x .

Rajah di atas menunjukkan graf garis lurus $\frac{y}{x}$ melawan $\frac{1}{x}$. Ungkapkan y dalam sebutan x .

[4 marks]

Answer :

- 12 Given that $\overrightarrow{AB} = \begin{pmatrix} -5 \\ m \end{pmatrix}$ and $\overrightarrow{CD} = \begin{pmatrix} -2 \\ k \end{pmatrix}$, find

Diberi $\overrightarrow{AB} = \begin{pmatrix} -5 \\ m \end{pmatrix}$ dan $\overrightarrow{CD} = \begin{pmatrix} -2 \\ k \end{pmatrix}$, cari

- (a) the value of m , if unit vector in the direction of $\overrightarrow{AB}$ is $\frac{-5}{13}\hat{i} + \frac{12}{13}\hat{j}$

nilai m , jika vector unit dalam arah $\overrightarrow{AB}$ ialah $\frac{-5}{13}\hat{i} + \frac{12}{13}\hat{j}$

- (b) the value of k , if $\overrightarrow{AB}$ is parallel to $\overrightarrow{CD}$
nilai k , jika $\overrightarrow{AB}$ selari dengan $\overrightarrow{CD}$.

[3 marks]

Answer : (a) $m = \dots\dots\dots$

(b) $k = \dots\dots\dots$

- 13 Given that the x-axis is the tangent to the function $f(x) = x^2 + (3k+2)x + 8k$. Find the possible values of .
*Diberi paksi-x adalah tangen kepada graf fungsi $f(x) = x^2 + (3k+2)x + 8k$.
Cari nilai-nilai yang mungkin bagi k.* [3 marks]

Answer: k =

14. The curve $y = f(x)$ passes through the point (2, 7). If $f'(x) = 3x^2 - \frac{2}{x^2}$, find $f(x)$.
Suatu lengkung $y = f(x)$ melalui titik (2, 7). Jika $f'(x) = 3x^2 - \frac{2}{x^2}$, carikan $f(x)$. [3 marks]

Answer:

15. Given that $\int_1^4 g(x)dx = 8$, find the value of p if $\int_1^4 [g(x) + px]dx = \frac{61}{2}$.

Diberi $\int_1^4 g(x)dx = 8$, cari nilai p jika $\int_1^4 [g(x) + px]dx = \frac{61}{2}$.

[3 marks]

Answer : $p = \dots\dots\dots$

-
16. Given that $y = (1 + 2x)^5$, find the value of $\frac{dy}{dx}$ when $x = -1$

Diberi $y = (1 + 2x)^5$, cari nilai $\frac{dy}{dx}$ apabila $x = -1$

[2 marks]

Answer : $\dots\dots\dots$

-
17. The radius of a sphere increase from 4 cm to 8cm in two seconds. Find the rate of increase of the surface area of the sphere.

Jejari sebuah sfera bertambah dari 4cm kepada 8cm dalam masa 2 saat. Cari kadar pertambahan luas permukaan sfera itu.

[4 marks]

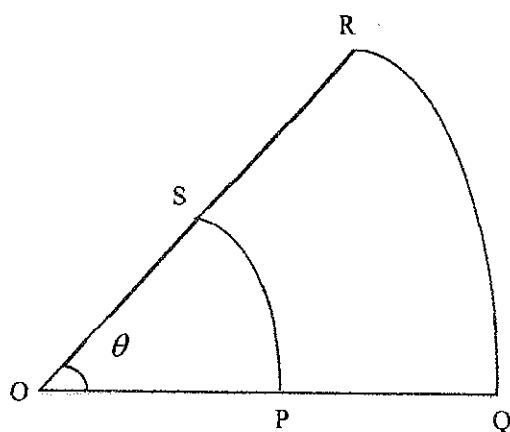
Answer: $\dots\dots\dots$

18. Find the small change of the surface area of the cube when the sides increase from 4 cm to 4.02 cm.

Cari perubahan hampir bagi luas permukaan sebuah kubus jika sisinya meningkat daripada 4 cm kepada 4.02 cm.

[3 marks]

Answer :



19. The diagram above shows two arcs PS and QR, centre O. Given that $OP = PQ = 5\text{cm}$ and the arc length $PS = 4\text{ cm}$, find

Rajah di atas menunjukkan dua lengkok PS dan QR berpusat O. Diberi $OP = PQ = 5\text{cm}$ dan panjang lengkok $PS = 4\text{cm}$, cari

- (a) the value of θ in radian
 nilai θ dalam radian
 (b) the perimeter of PQRS.
 perimeter PQRS

[3 marks]

Answer: (a)

(b).....

20. Find the sum of the sequence $5 + 1 + 0.2 + 0.4 + \dots$ to infinity.
 Cari hasil tambah jujukan $5 + 1 + 0.2 + 0.4 + \dots$ sehingga ketakterhinggaan

[3 marks]

Answer:

21. (a) Find $\int \frac{4-x^2}{x^4} dx$.

Cari $\int \frac{4-x^2}{x^4} dx$.

[2 marks]

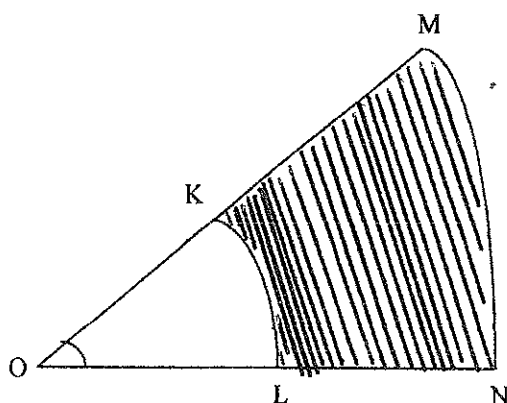
(b) If $\int \frac{8}{(1-2x)^5} dx = \frac{k}{(1-2x)^n}$, find the value of k and of n.

Jika $\int \frac{8}{(1-2x)^5} dx = \frac{k}{(1-2x)^n}$, cari nilai k dan nilai n [2 marks]

Answer : (a)

(b) k =

n =



- 22 The diagram above shows two sectors OMN and OKL with radius 9 cm and 3 cm respectively. Find the ratio of the shaded region to the area of the sector OKL.

Rajah di atas menunjukkan dua sektor bulatan OMN dan OKL yng masing-masing berjejari 9cm dan 3 cm. Carikan nisbah luas kawasan yang berlorek kepada luas sektor OKL.

[4 marks]

Answer :

2, 3, 4, 5, x, 8, 8, 9, y, 18

- 23 The information above shows a set of data arranged in increasing order. Given that the median and the mean are 7 and 7.5 respectively, find
Maklumat di atas menunjukkan set data yang disusun mengikut tertib menaik. Diberi median dan min adalah masing-masing 7 dan 7.5, cari
 (a) the value of x
nilai x,
 (b) the value of y
nilai y

[4 marks]

Answer: (a) x =

(b) y =

24. A set of data with 30 students has mean 65 and standard deviation 6.
Calculate
*Satu set data dengan 30 pelajar mempunyai markah min 65 dan sisihan piawai 6.
Hitungkan*

- (a) the sum of the student's mark
hasil tambah markah calon.
- (b) the sum of the squares of the student's mark
hasil tambah kuasa dua markah calon

[4 marks]

Answer : (a)

(b)

- 25 A committee of 5 people is to be chosen from 6 men and 7 women. Find the number of ways the committee can be formed if
satu jawatankuasa terdiri dari 5 orang hendak dipilih dari 6 orang lelaki dan 7 orang perempuan . Cari bilangan cara yang berlainan jawatankuasa itu dapat dibentuk jika

- (a) there is no restriction ,
tiada syarat dikenakan
- (b) the committee must has at most 2 women
jawatankuasa itu mengandungi selebih -lebihnya 2 orang perempuan

[4 marks]

Answer: (a)

(b)

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

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SULIT
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MATEMATIK
TAMBAHAN
OGOS
2013
2½ JAM

**SMK SEKSYEN 4 KOTA DAMANSARA
47810 PETALING JAYA
SELANGOR DARUL EHSAN**

PEPERIKSAAN PERCUBAAN SPM TAHUN 2013

**MATEMATIK TAMBAHAN
TINGKATAN 5**

**KERTAS 2
Dua jam tiga puluh minit**

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

Arahan :

- 1) Kertas soalan ini mengandungi 3 bahagian: Bahagian A, Bahagian B dan Bahagian C
- 2) Jawab semua soalan di Bahagian A, 4 soalan di Bahagian B dan 2 soalan di Bahagian C
- 3) Tunjukkan jalan kerja. Ia membantu anda untuk mendapatkan markah.
- 4) Rajah yang mengiringi masalah dalam kertas soalan ini dimaksudkan untuk memberi maklumat yang berguna bagi menyelesaikan masalah. Rajah tidak semestinya dilukis mengikut skala
- 5) Markah yang diperuntukkan bagi setiap soalan ditunjukkan dalam kurungan
- 6) Satu senarai rumus disediakan di halaman 2 dan 3
- 7) Jawab di kertas sendiri
- 8) Penggunaan kalkulator saintifik yang tidak boleh diprogramkan dibenarkan

Lihat sebelah

Kertas soalan ini mengandungi 15 halaman bercetak termasuk muka hadapan

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

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

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

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

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

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

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

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

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

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$$4 \quad \text{Area under a curve} \\ \text{Luas di bawah lengkung}$$

$$= \int_a^b y \, dx \text{ or (atau)}$$

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

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

Section A

[40 marks]

Answer **all** questionsJawab **semua** soalan

1. Solve the simultaneous equations:
Selesaikan persamaan serentak berikut:

$$2x + y = 1$$

$$x^2 + y^2 + 5xy = -17$$

[5 marks]

2. Given nine numbers 9, 2, p , q , 17, r , 7, s and 16 with mean 11 and varians 25.
 Calculate the mean and varians of p , q , r and s .
*Diberi sembilan nombor 9, 2, p , q , 17, r , 7, s dan 16 dengan min 11 dan varian 25.
 Hitungkan min dan varian bagi p , q , r dan s*

[6 marks]

3. Given that $2k + 9$, $2k$ and 12 are the first three terms of a geometric progression, where k is a constant.

Diberi bahawa $2k + 9$, $2k$ dan 12 adalah tiga sebutan pertama suatu jangjang geometri, di mana k ialah pemalar

- (a) Find the possible values of k and the corresponding common ratio of the progression

Cari nilai yang mungkin bagi k dan nisbah sepunya yang sepadan bagi jangjang itu.

[4 marks]

- (b) Hence find the sum to infinity of the geometric progression for $-1 < r < 1$.
Seterusnya, cari hasil tambah hingga ketakterhinggaan jangjang geometri untuk $-1 < r < 1$

[3 marks]

4. (a) Prove the identity $\operatorname{cosec} 2A + \cot 2A = \cot A$
Buktikan identity kosek $2A + \cot 2A = \cot A$

[3 marks]

- (b) Given that $\tan x = \frac{1}{p}$, where $p > 0$ for $0^\circ \leq x \leq 360^\circ$

Diberi bahawa $\tan x = \frac{1}{p}$, di mana $p > 0$ untuk $0^\circ \leq x \leq 360^\circ$

- (i) Express $\sec x \operatorname{cosec} x$ in term of p
Ungkapkan $\sec x \operatorname{cosec} x$ dalam sebutan p
- (ii) Hence, solve the equation $\sec x \operatorname{cosec} x = 2$
Seterusnya selesaikan persamaan $\sec x \operatorname{cosec} x = 2$

[4 marks]

5. (a) Given $px - 2$ is the gradient function of a curve with the turning point is $(1, 4)$
Diberi $px - 2$ ialah fungsi kecerunan suatu lengkung dan mempunyai titik pusingan $(1, 4)$

- (i) Find the value of p
Cari nilai p
- (ii) Hence, determine the equation of the curve.
Seterusnya, tentukan persamaan lengkung

[4 marks]

- (b) Diagram 5 shows the shaded region bounded by the curve $y = x^2 + 1$ and the horizontal line $y = k$

Rajah 5 menunjukkan rantau yang berlorek yang dibatasi oleh lengkung $y = x^2 + 1$ dan garis ufuk $y = k$

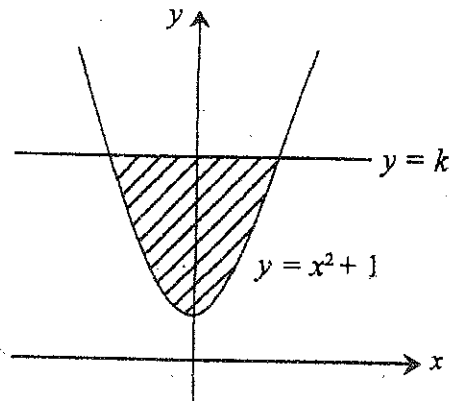


Diagram 5

Given the volume generated when the shaded region revolved 180° about the y -axis is $\frac{9}{2}\pi \text{ unit}^2$. Find the value of k .

Diberi isipadu yang dijana apabila rantau berlorek dikisar 180° pada paksi- y ialah $\frac{9}{2}\pi \text{ unit}^2$. Cari nilai k

[3 marks]

6. Solution by scale drawing is not accepted.
Penyelesaian secara lukisan berskala tidak diterima.

Diagram 6 shows two straight lines PQ and RS intersected at Q . The equation of PQ is $3x + 5y = 15$. Given that PQ and RS are perpendicular.

Rajah 6 menunjukkan dua garis lurus PQ dan RS bersilang di Q . Persamaan PQ ialah $3x + 5y = 15$. Diberi bahawa PQ dan RS adalah serenjang

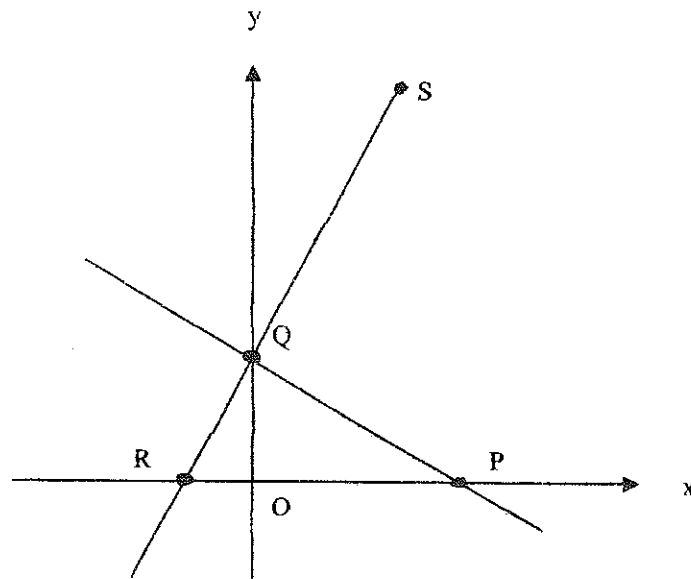


Diagram 6

- (a) Find the equation of RS.
Cari persamaan RS [3 marks]
- (b) If $RQ : QS = 1 : 4$, find the coordinates of S.
Jika $RQ : QS = 1 : 4$, cari koordinat S. [3 marks]
- (c) The point $M(x, y)$ moves in such a way that the distance $QM = 5$ unit, find the equation of locus of the point M.
Titik $M(x, y)$ bergerak dengan keadaan jarak $QM = 5$ unit, cari persamaan bagi lokus titik M. [2 marks]

Section B
[40 marks]

Answer any **four** questions from this section
Jawab mana-mana empat soalan daripada bahagian ini.

7. Diagram 7 shows a sector of a circle of radius r cm and the arc PQ which subtends an angle of θ radians. Express the length of the chord PQ in term of r and θ .

Rajah 7 menunjukkan suatu sektor bulatan jejari r cm dan lengkok PQ yang mencangkum suatu sudut θ radian. Ungkapkan panjang perentas PQ dalam sebutan r dan θ

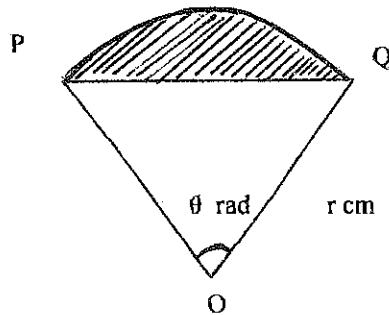


Diagram 7

If the perimeter of the triangle OPQ is two time the perimeter of shaded segment.

Show that $\sin \frac{\theta}{2} = 1 - \theta$

Jika perimeter segitiga OPQ adalah dua kali ganda perimeter tembereng berlorek. Tunjukkan bahawa $\sin \frac{\theta}{2} = 1 - \theta$

Hence, draw the graph of $y = \sin \frac{\theta}{2}$ and $y = 1 - \theta$ on the same axis for $0 \leq \theta \leq \frac{\pi}{2}$.

Find the value of θ .

Seterusnya, lukiskan graf $y = \sin \frac{\theta}{2}$ dan pada paksi $y = 1 - \theta$ yang sama bagi

$0 \leq \theta \leq \frac{\pi}{2}$. Cari nilai θ .

Given the radius $r = 8$ cm, find the area of the shaded segment.

Diberi jejari $r = 8$ cm, cari luas tembereng berlorek.

[10 marks]

8. Use graph paper to answer this question.
Gunakan kertas graf untuk menjawab soalan ini.

Table 8 shows the values of two variables, x and y , obtained from an experiment.

Variables x and y are related by equation $py = q - \frac{20}{x}$, where p and q are constants.

Jadual 8 menunjukkan nilai-nilai bagi dua pembolehubah, x and y , yang diperoleh daripada satu eksperimen. Pembolehubah x dan y dihubungkan oleh persamaan

$py = q - \frac{20}{x}$ dengan keadaan p dan q ialah pemalar.

x	2	5	8	11	14	17
y	27	12.2	8.5	6.8	5.8	5.2

Table 8

- (a) Plot xy against x , using a scale of 2 cm to 2 units on the x -axis and 2 cm to 10 units on the y -axis.
Hence, draw the line of best fit.
*Plotkan xy melawan x , dengan menggunakan skala 2cm kepada 2 unit pada paksi- x dan 2 cm kepada 10 unit pada paksi- y .
Seterusnya, lukis garis lurus penyuaian terbaik.*
- (b) Use the graph in 8(a) to find the value of
Gunakan graf di 8(a) untuk mencari nilai
- p ,
 - q ,

[5 marks]

[5 marks]

9. $OPQR$ is a trapezium with $\overrightarrow{OP} = 5\underline{p}$ and $\overrightarrow{OR} = 2\underline{r}$. Given $\overrightarrow{RQ} = \frac{3}{5}\overrightarrow{OP}$, S is a point on PQ such that $\overrightarrow{PS} = 2\overrightarrow{SQ}$. T is the intersection point of OS and PR .

$OPQR$ ialah sebuah trapezium dengan $\overrightarrow{OP} = 5\underline{p}$ dan $\overrightarrow{OR} = 2\underline{r}$. Diberi $\overrightarrow{RQ} = \frac{3}{5}\overrightarrow{OP}$, S terletak pada PQ dengan $\overrightarrow{PS} = 2\overrightarrow{SQ}$. T ialah titik persilangan OS dan PR .

- (a) Express in terms of $\underline{p}$ and $\underline{r}$:
Ungkapkan dalam sebutan $\underline{p}$ dan $\underline{r}$:

(i) $\overrightarrow{PR}$

(ii) $\overrightarrow{PQ}$

[3 marks]

- (b) Given $\overrightarrow{OT} = m\overrightarrow{OS}$ and $\overrightarrow{PT} = n\overrightarrow{PR}$. Express $\overrightarrow{OT}$ in term of .

Diberi $\overrightarrow{OT} = m\overrightarrow{OS}$ dan $\overrightarrow{PT} = n\overrightarrow{PR}$. Ungkapkan $\overrightarrow{OT}$ dalam sebutan

(i) $\underline{m}, \underline{p}$ and $\underline{r}$
 $\underline{m}, \underline{p}$ dan $\underline{r}$

(ii) $\underline{n}, \underline{p}$ and $\underline{r}$
 $\underline{n}, \underline{p}$ dan $\underline{r}$

[4 marks]

- (c) Find the values of m and n .
Cari nilai m dan n .

[3 marks]

10. Diagram 10 shows a straight line $x + y = 6$ intersecting a curve $y = 4x - x^2$ at the points P and Q

Rajah 10 menunjukkan suatu garis lurus $x + y = 6$ bersilang dengan suatu lengkung $y = 4x - x^2$ pada titik-titik P dan Q .

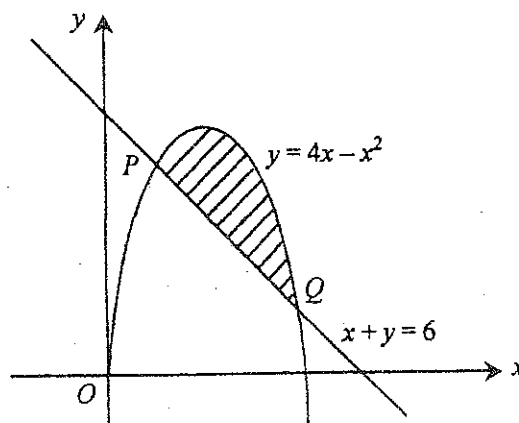


Diagram 10

Calculate / Hitung

- (a) the coordinates of points P and Q
koordinat P dan Q [3 marks]
- (b) the area of the shaded region,
luas rantau yang berlorek, [3 marks]
- (c) the volume generated when the region bounded by the curve and the x -axis is rotated completely about the x -axis
isipadu yang dijanakan apabila rantau dibatasi oleh lengkung dengan paksi- x berputar satu pusingan penuh pada paksi- x [4 marks]

11. The curve $y = x^3 - 6x^2 + 9x + 1$ passes through the point $A(2, 3)$ and has two turning points, $P(3, 1)$ and Q .

Lengkung $y = x^3 - 6x^2 + 9x + 1$ melalui titik $A(2, 3)$ dan mempunyai dua titik pusingan, $P(3, 1)$ dan Q .

Find/ Cari

- (a) the gradient of a curve at A
kecerunan lengkung itu pada A. [3 marks]
- (b) the equation of the normal to the curve at A.
persamaan normal kepada lengkung itu pada A [3 marks]
- (c) the coordinates of Q and determine whether Q is the maximum or the minimum point.
koordinat Q dan tentukan sama ada Q adalah titik maksimum atau titik minimum. [4 marks]

Section C

Answer any **two** questions from this section.

Jawab mana-mana dua soalan daripada bahagian ini.

- 12 (a) Table shows the price indices and weightage of four types of food for the year 2002 based on the year 2000. Given that the composite index for the year 2002 based on the year 2000 is 124
Jadual 12 menunjukkan indeks harga dan pemberat empat jenis makanan bagi tahun 2002 berasaskan tahun 2000. Diberi indeks gubahan bagi tahun 2002 berasaskan tahun 2000 ialah 124.

Food <i>Makanan</i>	Price Index <i>Indeks Harga</i>	Weightage <i>Pemberat</i>
Chicken/ Ayam	125	6
Meat/ Daging	140	4
Fish/ Ikan	120	8
Prawn/ Udang	p	2

Table 12

Determine/ Tentukan

- (i) the value of p ,
nilai p , [3 marks]
- (ii) price for a kilogram of prawn in the year 2002, if the price in the year 2000 is RM 8.40,
harga sekilogram udang dalam tahun 2002, jika harga dalam tahun 2000 ialah RM 8.40, [2 marks]
- (iii) if the price of meat in the year 2004 increase 20% compares to the year 2002 but the price of other food remain the same.. Find the composite index for the year 2004 based on the year 2000
Jika harga daging dalam tahun 2004 meningkat 20% berbanding dengan tahun 2002, tetapi harga makanan lain kekal sama. Cari indeks gubahan bagi tahun 2004 berasaskan tahun 2000. [2 marks]
- (b) The price indices of a good in the year 2006 based on the year 2000 and 2003 are 168 and 120 respectively. Find the price index of the good in the year 2003 based on the year 2000
Indeks harga suatu barangan dalam tahun 2006 berasaskan tahun 2000 dan 2003 masing-masing ialah 168 dan 120. Cari indeks harga barangan itu dalam tahun 2003 bersaskan tahun 2000 [3 marks]

14. Diagram 14 shows a quadrilateral ABCD,
Rajah 5 menunjukkan sebuah sisi empat ABCD.

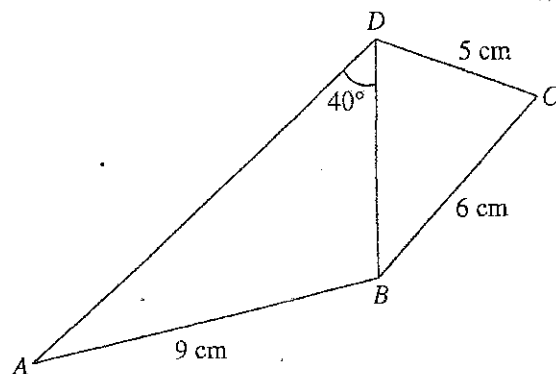


Diagram 14

The area of triangle BCD is 13 cm^2 and $\angle BCD$ is acute.

Luas segitiga BCD ialah 13 cm^2 dan $\angle BCD$ ialah tirus.

Calculate

Hitung

- (a) $\angle BCD$ [2 marks]
- (b) the length, in cm, of BD.
panjang, dalam cm, bagi BD. [2 marks]
- (c) $\angle ABD$ [3 marks]
- (d) the area, in cm^2 , of quadrilateral ABCD.
luas, dalam cm^2 , sisiempat ABCD. [3 marks]

END OF QUESTION PAPER

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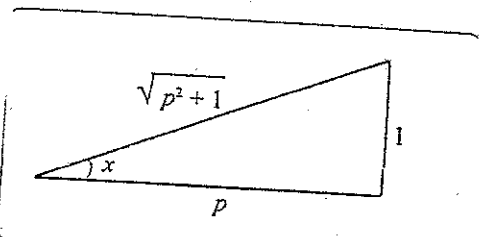
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.....
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SKIMA MATEMATIK TAMBAHAN TINGKATAN 5 KERTAS 2
PEPERIKSAAN PERCUBAAN SPM 2013

	Solution	Marks	Total
1	$2x + y = 1$ $y = 1 - 2x$ $x^2 + (1 - 2x)^2 + 5x(1 - 2x) = -17$ $5x^2 - x + 18$ $(5x + 9)(x - 2) = 0$ $x = -\frac{9}{5}, x = 2$ $y = 1 - 2\left(-\frac{9}{5}\right) = \frac{23}{5}, y = 1 - 2(2) = -3$	P1 K1 K1 N1 N1	5 Marks
2	$\frac{9 + 2 + p + q + 17 + r + 7 + s + 16}{9} = 11$ $51 + p + q + r + s = 99$ $p + q + r + s = 99 - 51 = 48$ $\frac{9^2 + 2^2 + p^2 + q^2 + 17^2 + r^2 + 7^2 + s^2 + 16^2}{9} - 11^2 = 25$ $679 + p^2 + q^2 + r^2 + s^2 = 1314$ $p^2 + q^2 + r^2 + s^2 = 635$ mean p, q, r and $s = \frac{48}{4} = 12$ variance p, q, r and s is $\frac{635}{4} - 12^2 = 14.75$	P1 K1 K1 K1 N1 N1	6 Marks
3	(a) $r = \frac{2k}{2k + 9} = \frac{12}{2k}$ $4k^2 - 24k - 108 = 0$ $k^2 - 6k - 27 = 0$ $(k + 3)(k - 9) = 0$ $k = -3, k = 9$ when $k = -3, r = \frac{12}{2(-3)} = -2$ when $k = 9, r = \frac{12}{2(9)} = \frac{2}{3}$	P1 K1 N1 N1	4 Marks

	(b) $r = \frac{2}{3}$, $k = 9$ and the first term, $a = 2(9) + 9 = 27$ $S_{\infty} = \frac{a}{1-r} = \frac{27}{1-\frac{2}{3}} = 81$	P1 K1 N1	3 Marks
4	(a) LHS $\operatorname{cosec} 2A + \cot 2A$ $= \frac{1}{\sin 2A} + \frac{\cos 2A}{\sin 2A}$ $= \frac{1 + (2\cos^2 A - 1)}{\sin 2A}$ $= \frac{2\cos^2 A}{2\sin A \cos A}$ $= \frac{\cos A}{\sin A} = \cot A$ (b) (i) Since $\tan x = \frac{1}{p}$  $\sec x \operatorname{cosec} x$ $= \frac{1}{\cos x} \times \frac{1}{\sin x}$ $= \frac{\sqrt{p^2 + 1}}{p} \times \sqrt{p^2 + 1}$ $= \frac{p^2 + 1}{p}$ (ii) Given $\sec x \operatorname{cosec} x = 2$ $\frac{p^2 + 1}{p} = 2$ $p^2 - 2p + 1 = 0$ $(p - 1)^2 = 0$ $p = 1, \tan x = 1 \text{ and positive}$	P1 K1 N1 K1 N1 K1	3 Marks

	$x = 45^\circ, 135^\circ$	N1	4 Marks
5	a)(i) $\frac{dy}{dx} = px - 2$ At the turning point, $\frac{dy}{dx} = 0$ when $x = 1$, $\frac{dy}{dx} = 0$ $p(1) - 2 = 0$ $p = 2$ (ii) $\frac{dy}{dx} = px - 2 = 2x - 2$ $y = \int (2x - 2) dx$ $y = \frac{2x^2}{2} - 2x + c$ The curve passes through (1, 4) $4 = (1)^2 - 2(1) + c$ $c = 5$ $y = x^2 - 2x + 5$ (b) when $x = 0$, $y = (0)^2 + 1 = 1$ $\frac{9}{2} \pi = \int_a^b \pi x^2 dy$ $\frac{9}{2} \pi = \int_a^b (y - 1) dy$ $\frac{9}{2} = \left[\frac{y^2}{2} - y \right]_1^4 = \left(\frac{k^2}{2} - k \right) - \left(\frac{1^2}{2} - 1 \right)$ $\frac{9}{2} = \frac{k^2}{2} - k + \frac{1}{2}$ $9 = k^2 - 2k + 1$ $k^2 - 2k - 8 = 0$ $(k - 4)(k + 2) = 0$ $k = 4, k = -2$ k is positive $k = 4$	K1 N1 K1 N1 P1 K1 N1	4 Marks 3 Marks
6	a) $5y = -3x + 15$ $y = -\frac{3}{5}x + 3$	P1 K1	

	$m_{PQ} = -\frac{3}{5}$ The y- intercept = 3, or coordinates of Q is (0,3) $m_{RS} = \frac{5}{3}$ $y = \frac{5}{3}x + 3$ (b) $0 = \frac{5}{3}x + 3$ $x = -\frac{9}{5}$ $\left(\frac{4\left(-\frac{9}{5}\right)}{1+4} + 1(x), \frac{4(0)+1(y)}{1+4} \right) = (0, 3)$ $-\frac{36}{5} + x = 0, \quad x = \frac{36}{5}$ $\frac{4(0)+1(y)}{1+4} = 3, \quad y = 15$ coordinates of S = $\left(\frac{36}{5}, 15 \right)$ © QM = 5 $\sqrt{(x-0)^2 + (y-3)^2} = 5$ $x^2 + y^2 - 6y + 9 = 25$ $x^2 + y^2 - 6y - 16 = 0$	N1 P1 K1 N1 K1 N1	6 Marks 2 Marks
7	From the diagram on the right $\sin \frac{\theta}{2} = \frac{x}{r}$ Therefore, $x = r \sin \frac{\theta}{2}$ The perimeter of triangle OPQ = $2r + 2r \sin \frac{\theta}{2}$ The perimeter of shaded segment = $r\theta + 2r \sin \frac{\theta}{2}$ $2r + 2r \sin \frac{\theta}{2} = 2r(\theta + 2r \sin \frac{\theta}{2})$ $2r + 2r \sin \frac{\theta}{2} = 2r\theta + 4r \sin \frac{\theta}{2}$	P1 K1	P1 K1

$$2r - 2r\theta = 2r \sin \frac{\theta}{2}$$

divide by $2r = \sin \frac{\theta}{2} = 1 - \theta$

$$y = \sin \frac{\theta}{2}$$

$\sin \frac{\theta}{2}$	0	0.156	0.309	0.454	0.588	0.707
θ	0	$\frac{\pi}{10}$	$\frac{\pi}{5}$	$\frac{3\pi}{10}$	$\frac{2\pi}{5}$	$\frac{\pi}{2}$

$$y = 1 - \theta$$

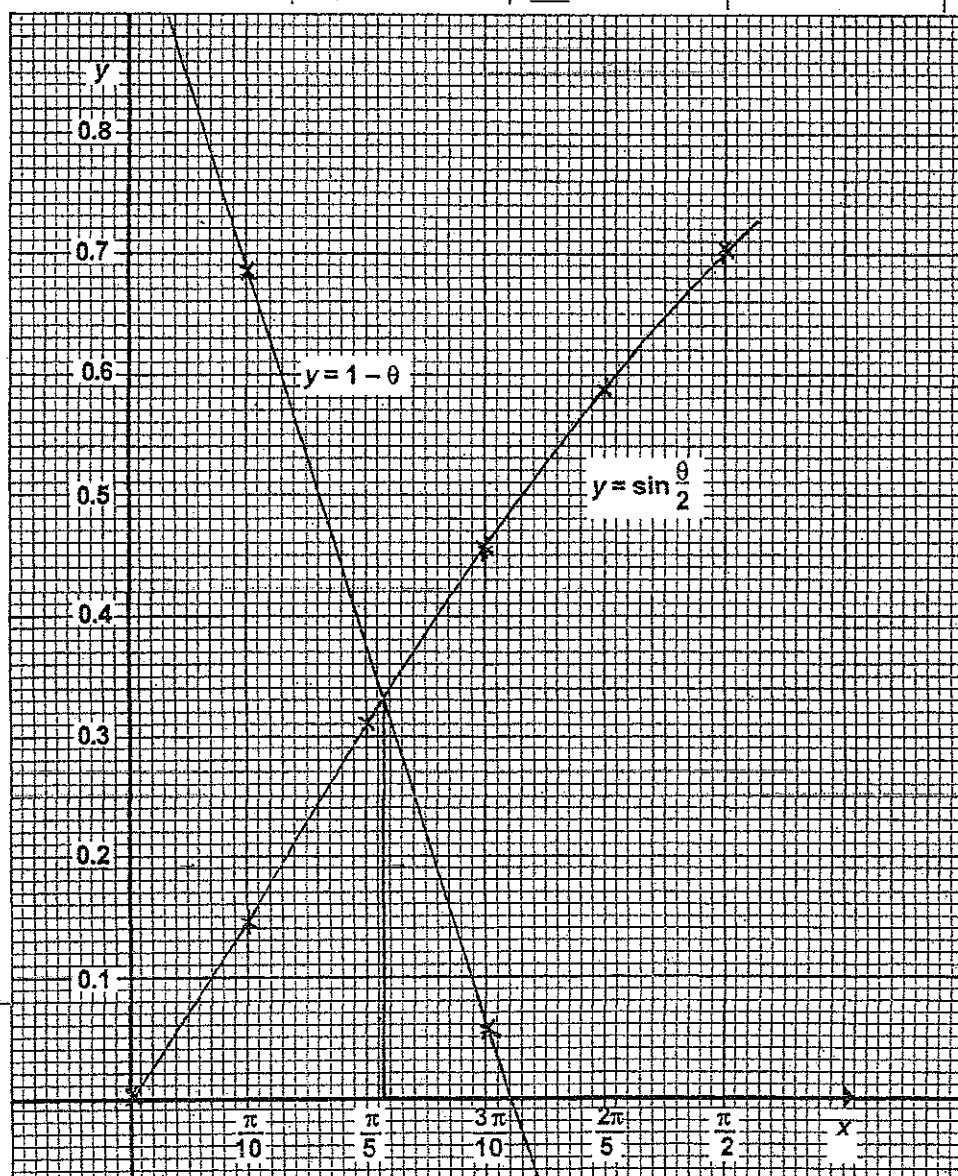
$y = 1 - \theta$	0.686	0.058
θ	$\frac{\pi}{10}$	$\frac{3\pi}{10}$

K1

N1

K1

K1



10 Marks

8

$$py = q - \frac{20}{x}$$

$$pyx = qx - 20$$

$$xy = \frac{q}{p}x - 20$$

$$xy = \frac{q}{p}x - \frac{20}{p}$$

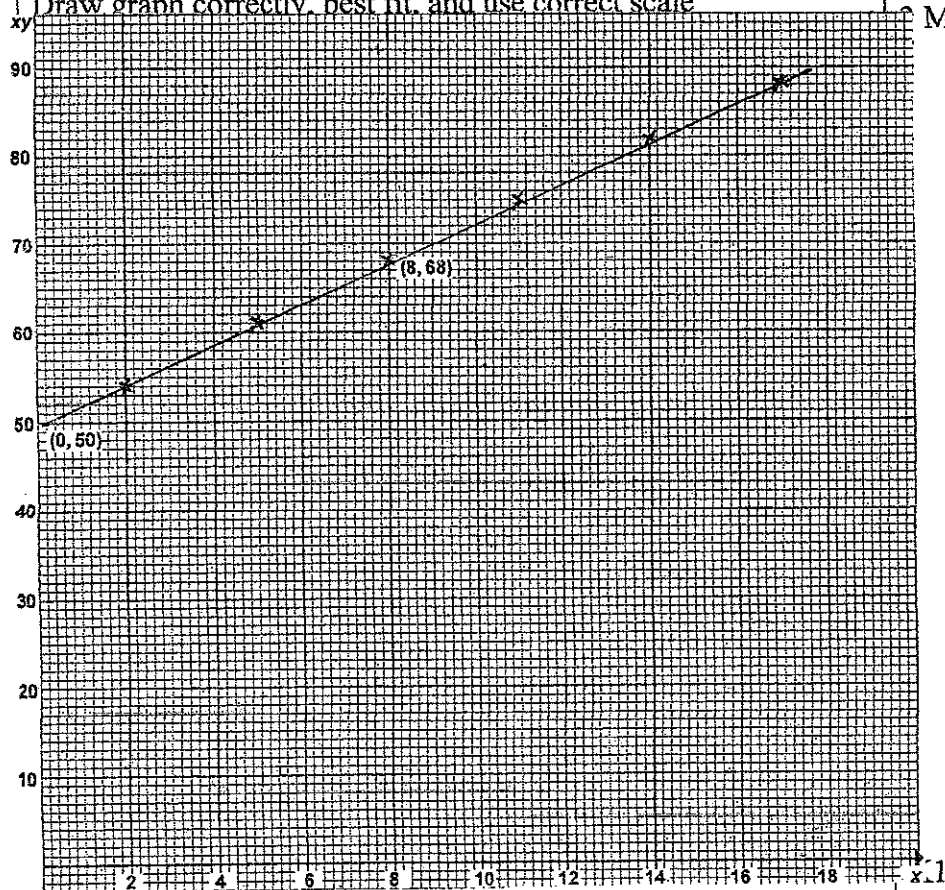
$$Y = xy, X = x, m = \frac{q}{p}, c = \frac{20}{p}$$

x	2	5	8	11	14	17
xy	54	61	68	74.8	81.2	88.4

K1

N1

Draw graph correctly, best fit, and use correct scale



M

5 marks

$$\frac{20}{p} = 50$$

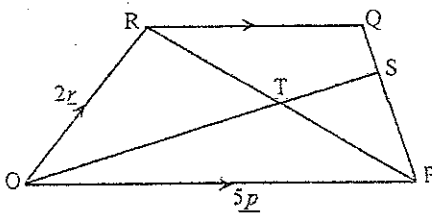
$$p = 0.4$$

(ii) the gradient of the graph,

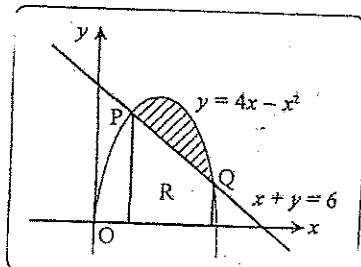
$$m = \frac{68 - 50}{8 - 0} = 2.25$$

N1

K1

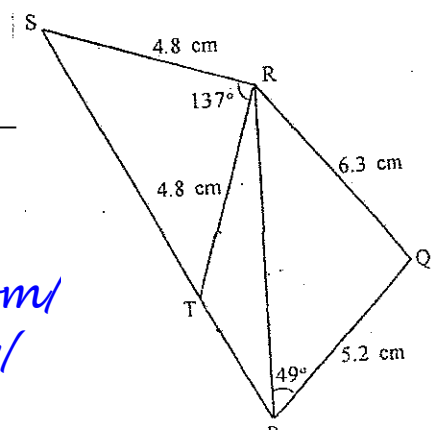
	$\frac{q}{p} = 2.25$ $\frac{q}{0.4} = 2.25$ $q = 0.9$	N1 N1	5 Marks
9	 (a) $\vec{PR} = \vec{PQ} + \vec{OR}$ $= -5\vec{p} + 2\vec{r}$ $\vec{PQ} = \vec{PO} + \vec{OR} + \vec{RQ}$ $= -5\vec{p} + 2\vec{r} + \frac{3}{5}(5\vec{p})$ $= -2\vec{p} + 2\vec{r}$ (b) (i) $\vec{OT} = m\vec{OS}$ $= m(\vec{OP} + \vec{PS})$ $= m\vec{OP} + m(\frac{2}{3}\vec{PQ})$ $= 5m\vec{p} + \frac{2}{3}m(-2\vec{p} + 2\vec{r})$ $= 5m\vec{p} - \frac{4}{3}m\vec{p} + \frac{4}{3}m\vec{r}$ $= \frac{11}{3}m\vec{p} + \frac{4}{3}m\vec{r}$	P1 K1 N1 K1 N1	3 Marks 2 Marks

	(ii) $\vec{OT} = \vec{OP} + \vec{PT}$ $\vec{OP} + n\vec{PR}$ $= 5\vec{p} + n(-5\vec{p} + 2\vec{r})$ $= (5 - 5n)\vec{p} + 2n\vec{r}$ © $OT = \frac{11}{3}m\vec{p} + \frac{4}{3}m\vec{r}$ $\frac{11}{3}m = 5 - 5n$ $\frac{4}{3}m = 2n$, or $n = \frac{2}{3}m$ Substitute $n = \frac{2}{3}m$ into $\frac{11}{3}m = 5 - 5n$ $\frac{11}{3}m = 5 - 5\left(\frac{2}{3}m\right)$ $\frac{11}{3}m + \frac{10}{3} = 5$ $7m = 5$ $m = \frac{5}{7}$ $n = \frac{2}{3} \times \frac{5}{7} = \frac{10}{21}$	K1 N1 K1	2 Marks
		K1	
		N1	3 Marks
10	Solve the simultaneous equation, $x + y = 6$ and $y = 4x - x^2$ $x + y = 6$ $y = 6 - x$ $6 - x = 4x - x^2$ $x^2 - 5x + 6 = 0$ $(x - 2)(x - 3) = 0$ $x = 2, x = 3$ when $x = 2, y = 4$ when $x = 3, y = 3$ Coordinates of $P = (2, 4)$ and $Q = (3, 3)$ (b) Area of shaded region $= \int_2^3 (4x - x^2) dx - \frac{1}{2} \times 1 \times (3 + 4)$ $= \left[\frac{4x^2}{2} - \frac{x^3}{3} \right]_2^3 - \frac{7}{2}$	P1 K1 N1 K1	3 marks



	$y - 3 = \frac{1}{3}(x - 2)$ $3y - 9 = x - 2$ $x - 3y + 7 = 0$ © At turning points, $\frac{dy}{dx} = 0$ $3x^2 - 12x + 9 = 0$ $x^2 - 4x + 3 = 0$ $(x - 3)(x - 1) = 0$ $x = 1 \text{ or } x = 3$ At P(3, 1), $x = 3$ At Q, $y = 1^3 - 6(1)^2 + 9(1) + 1$ $= 1 - 6 + 9 + 1$ $= 5$ The coordinates of Q are (1, 5) $\frac{d^2y}{dx} = 6x - 12$	P1 K1 N1 P1 K1 K1 N1	3 Marks 4 Marks
12	(a) (i) The composite index $= \frac{\sum wI}{\sum w}$ $\frac{125 \times 6 \times 140 \times 4 \times 120 \times 8 \times p \times 2}{20} = 124$ $2270 + 2p = 2480$ $2p = 210$ $p = 105$ ii) $I = \frac{P_{2002}}{P_{2000}} \times 100$ $105 = \frac{P_{2002}}{8.4} \times 100$ $P_{2002} = \frac{105}{100} \times 8.4 = \text{RM } 8.82$ (iii) Price index for meat $I_{2004,2000} = I_{2002,2000} \times \frac{120}{100}$ $= 140 \times \frac{120}{100} = 168$ the composite index	P1 K1 N1 K1 N1 K1	3 Marks 2 Marks

	$= \frac{125 \times 6 \times + 168 \times 4 + 120 \times 8 + 105 \times 2}{20} = 129.6$	N1	2 Marks
	$(b) I_{2006,2000} = \frac{P_{2006}}{P_{2000}} \times 100 = 168$	K1	
	$I_{2006,2003} = \frac{P_{2006}}{P_{2003}} \times 100 = 120$	K1	
	$I_{2003,2000} = \frac{P_{2003}}{P_{2000}} \times 100$		
	$1 = \frac{P_{2003}}{P_{2006}} \times \frac{P_{2006}}{P_{2000}} \times 100$		
	$= \frac{100}{120} \times \frac{168}{100} \times 100$	N1	3 marks
	$= 140$		
13	(a) $\frac{\sin R}{r} = \frac{\sin P}{p}$ $\frac{\sin \angle PRQ}{5.2} = \frac{\sin \angle RPQ}{6.3}$ $\sin \angle PRQ = \frac{\sin 49^\circ}{5.2} \times 6.3 = 0.9144$ $\angle PRQ = 66.11^\circ$ $\angle PQR = 180^\circ - 49^\circ - 66.11^\circ = 64.89^\circ$ $\frac{PR}{\sin 64.89^\circ} = \frac{6.3}{\sin 49^\circ}$ $PR = \frac{6.3}{\sin 49^\circ} \times \sin 64.89^\circ = 7.56 \text{ cm}$ (b) $a^2 + b^2 + c^2 - 2bc \cos A$ $PS^2 = 7.56^2 + 4.8^2 - 2(7.56)(4.8) \cos 137^\circ$ $PS^2 = 80.1936 + 53.0787$ $= 133.2723$ $PS = 11.54 \text{ cm}$ (c) $\frac{\sin \angle PSR}{7.56} = \frac{\sin 137^\circ}{11.54}$ $\sin \angle PSR = \frac{\sin 137^\circ}{11.54} \times 7.56 = 0.4468$ $\angle PSR = 26.54^\circ = \angle RTS$ $\angle RPS = 180^\circ - 137^\circ - 26.54^\circ = 16.46^\circ$ $\angle PRT = 26.54^\circ - 16.46^\circ = 10.08^\circ$	K1 N1 K1 N1 K1 N1 K1 N1	4 Marks 2 Marks



	Area of triangle PRT $= \frac{1}{2} \times 4.8 \times 11.54 \times \sin 10.08 = 4.85 \text{ cm}^2$	N2	4 Marks
14	(a) Area of ABCD = 13 cm^2 $\frac{1}{2} (5)(6) \sin \angle BCD = 13$ $\sin \angle BCD = \frac{13}{15}$ $\angle BCD = 60^\circ 4'$ (b) In $\triangle BCD$ $BD = 5^2 + 6^2 - 2(5)(6)\cos 60^\circ 4'$ $BD = 5.573 \text{ cm}$ (c) In $\triangle ABD$ $\frac{\sin \angle BAD}{5.572} = \frac{\sin 40^\circ}{9}$ $\sin \angle BAD = \frac{5.573 \sin 40^\circ}{9}$ $= 0.3980$ $\angle BAD = 23^\circ 27'$ $\angle ABD = 180^\circ - 40^\circ - 23^\circ 27'$ $= 116^\circ 33'$ (d) Area of quadrilateral ABCD $= \text{Area of } \triangle BCD + \triangle BAD$ $= 13 + \frac{1}{2} (9) (5.573) \sin 116^\circ 33'$ $= 35.43 \text{ cm}^2$	K1 N1 K1 N1 P1 K1 N1 K2 N1	2 Marks 2 Marks 3 Marks 3 Marks
	Total Marks		100 Marks

ADDITIONAL MATHEMATICS PAPER 1 FORM 5
(ANSWER SCHEME) Peperiksaan Percubaan SPM 2013

	Question	Marks	Total
1	(a) 3 (b) $\{(0,0)(1,1)(4,2)(9,3)(16,4)\}$	1 1	2 Marks
2	$m = 3$ B2: $2 - m(-2) = 8$ atau $\frac{2-8}{m} = -2$ B1: $f(-2) = 8$ atau $f^{-1}(x) = \frac{2-x}{m}$	3	3 Marks
3	$4x^2 + 11x - 3 = 0$ B2: $x^2 + \frac{11}{4}x - \frac{3}{4} = 0$ B1: $x^2 - (\frac{1}{4} + (-3))x + (\frac{1}{4})(-3) = 0$	3	3 Marks
4	$\frac{-5}{2} \leq x \leq 3$ B2: $(2x+5)(-x+3) \geq 0$ atau $(2x+5)(x-3) \leq 0$ B1: $-2x^2 + x + 15 \geq 0$ atau $2x^2 - x - 15 \leq 0$	3	3 Marks
5	$x = -4$ B1: $5^x = 5^{-4}$ B1: untuk 5^x dan 5^{-4}	2	2 Marks
6	$\frac{3q+p}{p}$ B2: $\frac{3\log + \log_r 5}{\log_r 5}$ guna hokum log B1: $\frac{\log_r 135}{\log_r 5}$ tukar asas	3	3 Marks
7	(a) 3 (b) 968 B2: guna $S_{20} - S_4$ atau $S_{16} = \frac{16}{2}[2(23) + (16-1)(5)]$ B1: $a = 3$ dan $d = 5$ atau $n = 16$ dan $a = 23$	1 3	4 Marks

8	$k = \frac{1}{5}$ $B2: k(5k-1)$ $B1: \frac{1+3k}{1+k} = \frac{1+4k}{1+3k}$	3	3 Marks
9	$m = 3$ $B1: \frac{3m+1(-5)}{m+1} = 1$	2	2 Marks
10	$y = \frac{1}{2}x - 4$ $B3: y - (-1) = \frac{1}{2}(x - 6)$ $B2: m_2 = \frac{1}{2}$ $B1: m_1 = -2$	4	4 Marks
11	$y = 6x + \frac{3}{2}$ atau setara $B3: \frac{y}{x} = \frac{3}{2}\left(\frac{1}{x}\right) + 6$ $B2: \text{kecerunan} = \frac{3}{2}$ dan pintasan- $y = 6$ $B1: \text{kecerunan} = \frac{3}{2}$ atau pintasan- $y = 6$	4	4 Marks
12	$(a) m = 12$ $(b) k = \frac{24}{5}$ $B1: \frac{12}{-5} = \frac{k}{-2}$	1 2	3 Marks
13	$k = \frac{2}{9}, 2$ $B2: 9k^2 - 20k + 4 = 0$ $B1: (3k+2)^2 - 4(1)(8k) = 0$	3	3 Marks
14	$f(x) = x^3 + \frac{2}{x} - \frac{5}{3}$ $B2: 7 = (2)^3 + \frac{2}{(3)} + c$ $B1: y = \frac{3x^2}{3} - \frac{2x^{-1}}{-1} + c$	3	3 Marks

15	$p = 3$ $B2: 8 + \left[\frac{p(4)^2}{2} - \frac{p(1)^2}{2} \right] = \frac{61}{2}$ $B1: \frac{px^2}{2}$	3	3 Marks
16	10 $B1: \frac{dy}{dx} = 5(1+2x)^4 (2)$ $terima 5(1+2x)^4$	2	2 Marks
17	64π $B3: 8\pi(4) \times 2$ (guna petua rantai) $B2: \frac{dj}{dt} = 2$ $B1: \frac{dl}{dj} = 8\pi j$	4	4 Marks
18	0.96cm^2 $B2: \delta l = 12(4)(0.02)$ $B1: \frac{dl}{dx} = 12x$	3	3 Marks
19	$(a) \theta = \frac{4}{5} = 0.8 \text{ rad}$ $(b) 22$ $B1: \text{Perimeter PQRS} = 5 + 5 + 4 + 8$	1 2	3 Marks
20	$\frac{25}{4}$ $B2: \frac{5}{1 - \frac{1}{5}}$ $B1: r = \frac{1}{5}$	3	3 Marks
21	$(a) \frac{4x^{-3}}{-3} - \frac{x^{-1}}{-1} + c$ $B1: \frac{4x^{-3}}{-3} \text{ atau } -1 \frac{x^{-1}}{-1}$ $(b) k = 1$ $n = 4$	2 1	

		1	4 Marks
22	$8 : 1$ $B3: \frac{36\theta}{4.5\theta}$ atau setara $B2: \text{luas lorek } \frac{1}{2}(9)^2 \theta - \frac{1}{2}(3)^2 \theta$ $B1: \frac{1}{2}(9)^2 \theta \text{ atau } \frac{1}{2}(3)^2 \theta$	4	4 Marks
23	$(a) x = 6$ $B1: \frac{x+8}{2} = 7$ $(b) y = 12$ $B1: \frac{2+3+4+5+6+8+8+9+y+18}{10} = 7.5$	2 2	4 Marks
24	$(a) \sum x = 1950$ $B1: \frac{\sum x}{30} = 65$ $(b) \sum x^2 = 127830$ $B1: 6 = \sqrt{\frac{\sum x^2}{30} - 65^2}$	2 2	4 Marks
25	$(a) 1287$ $B1: {}^{13}C_5$ $(b) 531$	2 2	4 Marks
	Total		80 Marks