

NAMA .....

KELAS .....

3472/1

Matematik

Tambahan

Kertas 1

Julai / Ogos

2026

2 jam



**MAJLIS PENGETUA SEKOLAH MALAYSIA  
NEGERI SEMBILAN**

**PROGRAM PENINGKATAN AKADEMIK TINGKATAN LIMA  
SEKOLAH MENENGAH NEGERI SEMBILAN 2026**

**MATEMATIK TAMBAHAN**

**Kertas 1**

**Dua jam**

**JANGAN BUKA KERTAS SOALAN INI  
SEHINGGA DIBERITAHU**

- 1 Tulis nama dan kelas anda pada ruangan yang disediakan.
- 2 Kertas soalan ini adalah dalam dwibahasa.
- 3 Soalan dalam Bahasa Melayu mendahului soalan yang sepadan dalam Bahasa Inggeris.
- 4 Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam Bahasa Inggeris atau Bahasa Melayu.
- 5 Calon dikehendaki membaca maklumat di halaman 28.

| Untuk Kegunaan Pemeriksa |        |              |                  |
|--------------------------|--------|--------------|------------------|
| Bahagian                 | Soalan | Markah Penuh | Markah Diperoleh |
| A                        | 1      | 4            |                  |
|                          | 2      | 5            |                  |
|                          | 3      | 5            |                  |
|                          | 4      | 3            |                  |
|                          | 5      | 5            |                  |
|                          | 6      | 4            |                  |
|                          | 7      | 4            |                  |
|                          | 8      | 4            |                  |
|                          | 9      | 6            |                  |
|                          | 10     | 6            |                  |
|                          | 11     | 9            |                  |
|                          | 12     | 9            |                  |
| B                        | 13     | 8            |                  |
|                          | 14     | 8            |                  |
|                          | 15     | 8            |                  |
| Jumlah                   |        | 80           |                  |

Kertas soalan ini mengandungi 28 halaman bercetak

[Lihat halaman sebelah

## SULIT

RUMUS  
FORMULAE

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

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

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

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

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

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

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

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

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

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

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

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

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

$$14 \quad y = uv, \quad \frac{dy}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$$

$$15 \quad y = \frac{u}{v}, \quad \frac{dy}{dx} = \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v^2}$$

$$16 \quad \frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$$

$$17 \quad \text{Luas di bawah lengkung}$$

*Area under a curve*

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

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

$$32 \quad \sin 2A = 2 \sin A \cos A$$

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

$$18 \quad \text{Isi padu kisaran}$$

*Volume of revolution*

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

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

$$19 \quad I = \frac{Q_1}{Q_0} \times 100$$

$$20 \quad \bar{I} = \frac{\sum W_i I_i}{\sum W_i}$$

$$21 \quad {}^n P_r = \frac{n!}{(n-r)!}$$

$$22 \quad {}^n C_r = \frac{n!}{(n-r)!r!}$$

$$23 \quad P(X=r) = {}^n C_r p^r q^{n-r}, \quad p+q=1$$

$$24 \quad \text{Min / Mean, } \mu = np$$

$$25 \quad \sigma = \sqrt{npq}$$

$$26 \quad Z = \frac{X - \mu}{\sigma}$$

$$27 \quad \text{Panjang lengkok, } s = j\theta$$

*Arc length, } s = r\theta*

$$28 \quad \text{Luas sektor, } L = \frac{1}{2} j^2 \theta$$

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

$$29 \quad \sin^2 A + \cos^2 A = 1$$

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

$$30 \quad \sec^2 A = 1 + \tan^2 A$$

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

$$31 \quad \operatorname{cosec}^2 A = 1 + \cot^2 A$$

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

$$\begin{aligned} 33 \quad \cos 2A &= \cos^2 A - \sin^2 A \\ &= 2 \cos^2 A - 1 \\ &= 1 - 2 \sin^2 A \end{aligned}$$

$$\begin{aligned} \cos 2A &= \cos^2 A - \sin^2 A \\ &= 2 \cos^2 A - 1 \\ &= 1 - 2 \sin^2 A \end{aligned}$$

$$34 \quad \tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$$

$$\begin{aligned} 35 \quad \sin (A \pm B) &= \sin A \cos B \pm \cos A \sin B \\ \sin (A \pm B) &= \sin A \cos B \pm \cos A \sin B \end{aligned}$$

$$\begin{aligned} 36 \quad \cos (A \pm B) &= \cos A \cos B \mp \sin A \sin B \\ \cos (A \pm B) &= \cos A \cos B \mp \sin A \sin B \end{aligned}$$

$$37 \quad \tan (A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

$$38 \quad \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\begin{aligned} 39 \quad a^2 &= b^2 + c^2 - 2bc \cos A \\ a^2 &= b^2 + c^2 - 2bc \cos A \end{aligned}$$

$$\begin{aligned} 40 \quad \text{Luas segi tiga / Area of triangle} \\ &= \frac{1}{2} ab \sin C \end{aligned}$$

$$\begin{aligned} 41 \quad \text{Titik yang membahagi suatu tembereng garis} \\ \text{A point dividing a segment of a line} \end{aligned}$$

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

$$\begin{aligned} 42 \quad \text{Luas segi tiga / Area of triangle} \\ &= \frac{1}{2} |(x_1 y_2 + x_2 y_3 + x_3 y_1) - (x_2 y_1 + x_3 y_2 + x_1 y_3)| \end{aligned}$$

$$43 \quad |\mathbf{r}| = \sqrt{x^2 + y^2}$$

$$44 \quad \hat{\mathbf{r}} = \frac{x\mathbf{i} + y\mathbf{j}}{\sqrt{x^2 + y^2}}$$

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SULIT

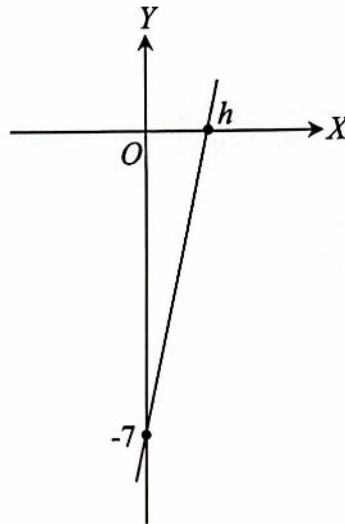


**Bahagian A****[64 markah]**

Jawab semua soalan.

- 1 Rajah 1 menunjukkan graf garis lurus yang diperoleh apabila  $y = -7x^3 + 5$  ditukarkan dalam bentuk linear.

Diagram 1 shows the straight line graph obtained when  $y = -7x^3 + 5$  is reduced to linear form.



Rajah 1  
Diagram 1

- (a) Ungkapkan  $X$  dan  $Y$  dalam sebutan  $x$  dan / atau  $y$ .  
Express  $X$  and  $Y$  in terms of  $x$  and / or  $y$ .

**[2 markah]****[2 marks]**

- (b) Cari nilai  $h$ .  
Find the value of  $h$ .

**[2 markah]****[2 marks]**

Jawapan / Answer:

- 2 Dalam suatu jangjang geometri, diberi nilai sebutan pertama ialah separuh daripada nilai nisbah sepunya.

*In a geometry progression, it is given that the value of the first term is half of the value of the common ratio.*

Cari

Find

- (a) nilai sebutan pertama dan nisbah sepunya jika nilai sebutan ketiga ialah 1372,  
*the value of the first term and common ratio if the value of the third term is 1372,*  
[4 markah]  
[4 marks]
- (b) hasil tambah  $n$  sebutan pertama.  
*the sum of the first  $n$  terms.*

[1 markah]

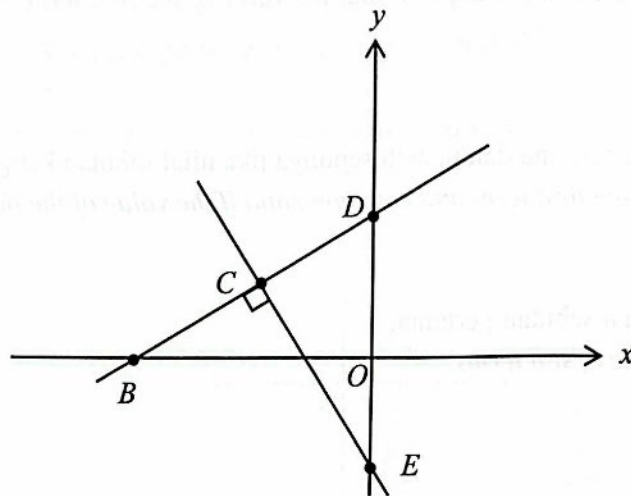
[1 mark]

Jawapan / Answer:

**SULIT**

- 3 Rajah 2 menunjukkan garis lurus  $CE$  ialah pembahagi dua sama serenjang bagi garis lurus  $BD$ .

*Diagram 2 shows the straight line  $CE$  is the perpendicular bisector of the straight line  $BD$ .*



Rajah 2  
Diagram 2

Diberi persamaan  $BD$  ialah  $\frac{y}{2} - \frac{x}{4} = 1$ . Cari

*Given the equation of  $BD$  is  $\frac{y}{2} - \frac{x}{4} = 1$ . Find*

- (a) koordinat  $C$ ,  
the coordinates of  $C$ ,
- (b) persamaan garis lurus  $CE$ .  
the equation of the straight line  $CE$ .

[2 markah]

[2 marks]

[3 markah]

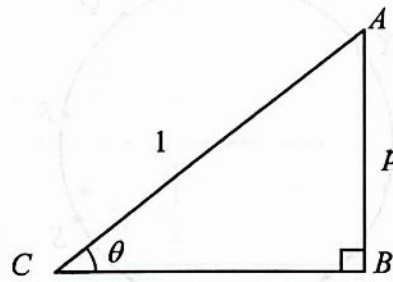
[3 marks]

Jawapan / Answer:

SULIT

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- 4 Rajah 3 menunjukkan sebuah segitiga  $ABC$ .  
 Diagram 3 shows a triangle  $ABC$ .



Rajah 3  
 Diagram 3

Ungkapkan dalam sebutan  $p$  bagi  
 Express in terms of  $p$  for

- (a)  $\sin^2 \theta$ , [1 markah]  
 [1 mark]  
 (b)  $\sec \theta$ . [2 markah]  
 $\sec \theta$ . [2 marks]

Jawapan / Answer:

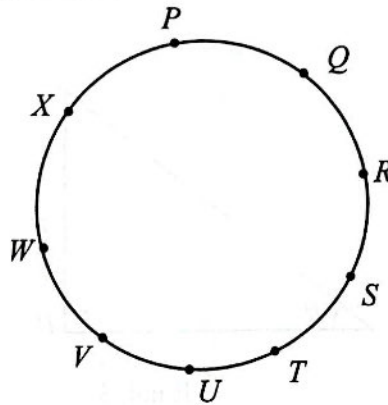


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 SULIT]

**SULIT**

- 5 Rajah 4 menunjukkan 9 titik di dalam sebuah bulatan.  
*Diagram 4 shows 9 points in a circle.*



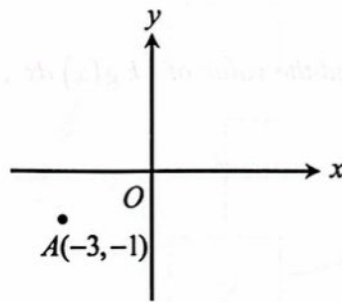
Rajah 4  
 Diagram 4

- (a) Cari bilangan segi tiga yang dapat dibentuk dalam bulatan jika titik-titik tersebut menjadi bucu bagi segi tiga.  
*Find the number of triangles that can be formed inside the circle if the points form the vertices of triangle.*
- [2 markah]  
 [2 marks]
- (b) Cari bilangan cara menyusun huruf-huruf dalam bulatan jika huruf *U* dan *V* berasingan.  
*Find the number of ways to arrange the letters in a circle if the letter *U* and *V* separately.*

[3 markah]  
 [3 marks]

Jawapan / Answer:

- 6 Rajah 5 menunjukkan titik  $A$  pada suatu satah Cartes.  
*Diagram 5 shows the point  $A$  on the Cartesian plane.*



Rajah 5  
 Diagram 5

- (a) Nyatakan  $\overrightarrow{OA}$  dalam bentuk  $\begin{pmatrix} x \\ y \end{pmatrix}$ .

*State  $\overrightarrow{OA}$  in the form of  $\begin{pmatrix} x \\ y \end{pmatrix}$ .*

[1 markah]

[1 mark]

- (b) Titik  $A$  dipantulkan pada paksi- $x$  ke titik  $A'$ . Diberi  $\overrightarrow{OB} = 3\mathbf{i} + 4\mathbf{j}$ , cari vektor unit dalam arah  $\overrightarrow{A'B}$  dalam sebutan  $\mathbf{i}$  dan  $\mathbf{j}$ .

*Point  $A$  is reflected about the  $x$ -axis to point  $A'$ . It is given that  $\overrightarrow{OB} = 3\mathbf{i} + 4\mathbf{j}$ , find the unit vector in the direction of  $\overrightarrow{A'B}$  in terms of  $\mathbf{i}$  and  $\mathbf{j}$ .*

[3 markah]

[3 marks]

Jawapan / Answer:

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 SULIT]

SULIT

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- 7 (a) Diberi  $\int_1^3 g(x) dx = 9$ , cari nilai  $\int_3^1 k g(x) dx$ , dalam sebutan  $k$ , dengan keadaan  $k$  adalah pemalar.

Given  $\int_1^3 g(x) dx = 9$ , find the value of  $\int_3^1 k g(x) dx$ , in terms of  $k$ , such that  $k$  is a constant.

[1 markah]

[1 mark]

- (b) Suatu lengkung mempunyai fungsi kecerunan,  $\frac{dy}{dx} = \frac{5}{(2x-3)^2}$  dan melalui titik  $P(1, 4)$ .

A curve has a gradient function,  $\frac{dy}{dx} = \frac{5}{(2x-3)^2}$  and passes through point  $P(1, 4)$ .

Cari persamaan lengkung itu.

Find the equation of the curve.

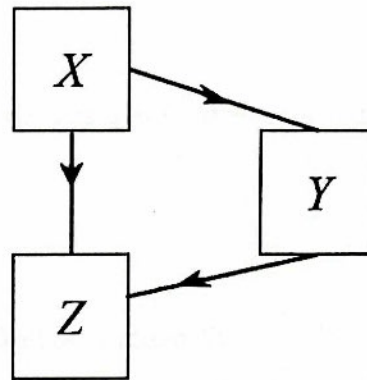
[3 markah]

[3 marks]

Jawapan / Answer:

- 8 Rajah 6 menunjukkan hubungan antara set  $X$ , set  $Y$  dan set  $Z$ .

Diagram 6 shows the relationship between set  $X$ , set  $Y$  and set  $Z$ .



Rajah 6  
Diagram 6

Diberi bahawa set  $X$  dipetakan kepada set  $Y$  oleh fungsi  $\frac{2x-1}{3}$  dan dipetakan kepada set  $Z$  oleh  $gf(x) = \frac{5x+7}{2}$ .

Given that set  $X$  is mapped to set  $Y$  by a function  $\frac{2x-1}{3}$  and mapped to set  $Z$  by  $gf(x) = \frac{5x+7}{2}$ .

- (a) Tulis fungsi yang memetakan set  $X$  kepada set  $Y$  dengan menggunakan tatatanda fungsi.

Write the function that maps set  $X$  to set  $Y$  using function notation.

[1 markah]

[1 mark]

- (b) Cari fungsi yang memetakan set  $Y$  kepada set  $Z$ .

Find the function that maps set  $Y$  to set  $Z$ .

[3 markah]

[3 marks]

Jawapan / Answer:

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Jawapan / Answer:



- 9 (a) Diberi  $\log_{\frac{1}{3}}(\log_c d) = 3$  boleh diungkapkan dalam sebutan  $d = c^{\frac{1}{y}}$ . Nyatakan nilai  $y$ .

*Given  $\log_{\frac{1}{3}}(\log_c d) = 3$  can be expressed in form of  $d = c^{\frac{1}{y}}$ . State the value of  $y$ .*

[2 markah]

[2 marks]

- (b) Diberi  $x$  ialah integer, selesaikan persamaan  $20\sqrt{2^x} - 2^{x+2} = 24$ .

*Given that  $x$  is an integer, solve the equation  $20\sqrt{2^x} - 2^{x+2} = 24$ .*

[4 markah]

[4 marks]

Jawapan / Answer:



SERTAI TELEGRAM @exercise\_students

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SULIT

**SULIT**

- 10 Pemboleh ubah rawak,  $X$ , mempunyai suatu taburan binomial dengan 3 cubaan dengan keadaan kebarangkalian kejayaan dalam setiap cubaan ialah  $p$  dan kebarangkalian kegagalan dalam setiap cubaan ialah  $q$ . Jadual 1 menunjukkan sebahagian daripada taburan kebarangkalian bagi  $X$ .

*A random variable,  $X$ , follows a binomial distribution with 3 trials such that the probability of success in each trial is  $p$  and the probability of failure in each trial is  $q$ . Table 1 shows part of the probability distribution of  $X$ .*

| $X$        | 0              | 1   | 2   | 3               |
|------------|----------------|-----|-----|-----------------|
| $P(X = x)$ | $\frac{1}{64}$ | $m$ | $n$ | $\frac{27}{64}$ |

Jadual 1

Table 1

- (a) Nyatakan nilai  $m + n$ .  
State the value of  $m + n$ .

[1 markah]

[1 mark]

- (b) Dalam sebuah pusat latihan memandu, didapati bahawa 75% daripada calon ujian memandu praktikal lulus dalam cubaan pertama mereka. Satu sampel yang terdiri daripada  $n$  calon ujian memandu yang lulus telah dipilih secara rawak. Diberi bahawa kebarangkalian semua calon memandu lulus ialah 0.3164. Cari

*In a driving training centre, it was found that 75% of the practical driving test candidates passed on their first attempt. A sample of  $n$  passing candidates driving test was chosen at random. It is given that the probability of all candidate's pass is 0.3164. Find*

- (i) nilai  $n$ ,  
the value of  $n$ ,  
(ii) kebarangkalian sekurang-kurangnya seorang calon lulus ujian memandu.  
the probability that at least one candidate passes the driving test.

[ 5 markah]

[ 5 marks]

Jawapan / Answer:

**SULIT****3472/1****Jawapan / Answer:**

Diagram  
Diagram

Given that  $AB = 10$  cm,  $BC = 6$  cm and  $AC = 8$  cm.  
Find the area of the triangle ABC.

(1 mark)

Find

Find

Find the area of the triangle ABC.

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Find the area of the triangle ABC.

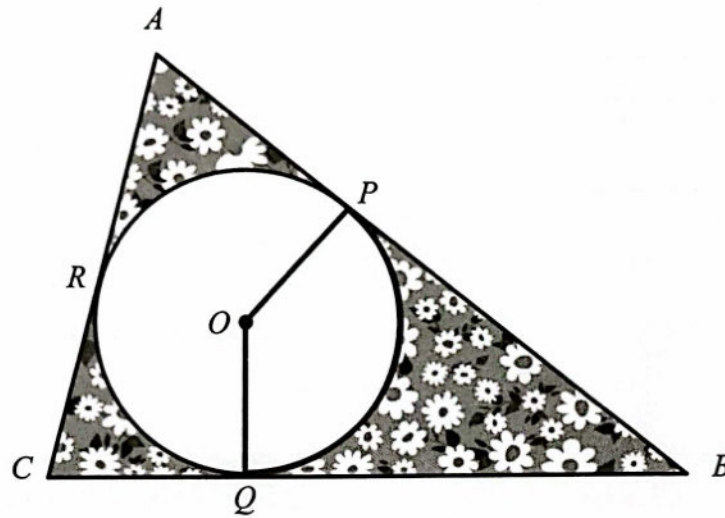
Find the area of the triangle ABC.

Find the area of the triangle ABC.

## SULIT

- 11 Rajah 7 menunjukkan sebuah kolam bulat berpusat di  $O$  berada di dalam taman bunga berbentuk segitiga  $ABC$ . Laluan pejalan kaki di sepanjang sisi  $AB$ ,  $BC$  dan  $AC$  dibina supaya setiap laluan itu menyentuh kolam pada titik  $P$ ,  $Q$  dan  $R$ .

*Diagram 7 shows circular pond with centre  $O$  located in a triangle shaped flower garden  $ABC$ . Footpaths along the sides  $AB$ ,  $BC$  and  $AC$  are built such that each path touches the pond at points  $P$ ,  $Q$  and  $R$ .*



Rajah 7  
Diagram 7

Diberi bahawa  $AB = 20$  m,  $BC = 21$  m,  $OP = 5$  m dan  $PB = QB = 12$  m.  
Given that  $AB = 20$  m,  $BC = 21$  m,  $OP = 5$  m and  $PB = QB = 12$  m.

[Gunakan  $\pi = 3.142$ ]

[Use  $\pi = 3.142$ ]

Hitung

Calculate

- panjang lengkok minor kolam  $PQ$ , dalam meter.  
the length of the minor arc of the pond  $PQ$ , in metres.  
[3 markah]  
[3 marks]
- jumlah perimeter kawasan taman bunga yang dibatasi oleh laluan pejalan kaki  $AP$ ,  $CQ$ ,  $CA$  dan lengkok major kolam  $PQ$ , dalam meter.  
the total perimeter of the flower garden region bounded by the footpaths  $AP$ ,  $CQ$ ,  $CA$  and the major arc  $PQ$ , in meter.  
[3 markah]  
[3 marks]
- luas kawasan taman bunga yang tidak diliputi oleh kolam, dalam  $\text{m}^2$ .  
the area of the flower garden that is not covered by the pond, in  $\text{m}^2$ .  
[3 markah]  
[3 marks]

**SULIT****3472/1****Jawapan / Answer:**[Lihat halaman sebelah  
**SULIT**

- 12 (a) Dengan menggunakan kaedah penggantian, tentukan pembezaan peringkat pertama bagi

*By using the substitution method, determine the first derivative of*

$$y = 2(3x - 4)^3$$

[3 markah]

[3 marks]

- (b) Seterusnya, cari

*Hence, find*

- (i) nilai  $\frac{dy}{dx}$  apabila  $x = 1.20$  cm.

*the value of  $\frac{dy}{dx}$  when  $x = 1.20$  cm.*

- (ii) nilai hampir bagi  $2(3(1.19) - 4)^3$  dan peratus perubahannya.

*approximate value for  $2(3(1.19) - 4)^3$  and its percentage change.*

[6 markah]

[6 marks]

Jawapan / Answer:

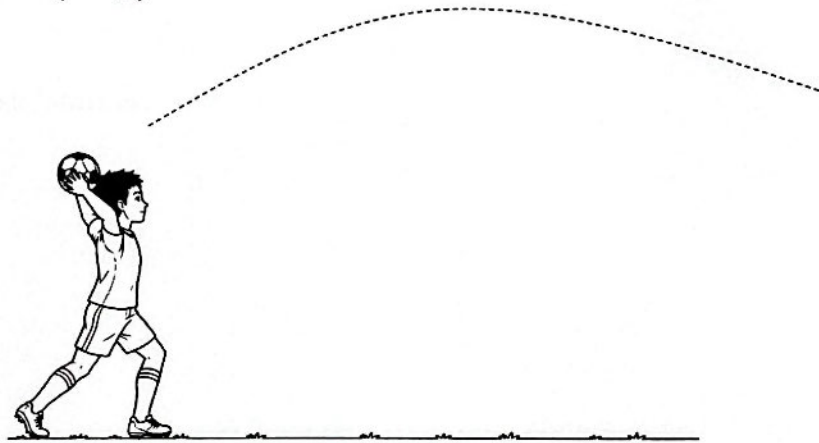
## Bahagian B

[16 markah]

Jawab mana-mana dua soalan daripada bahagian ini.

- 13 Dalam satu perlawanan bola sepak, seorang pemain melakukan lontaran ke dalam padang selepas bola keluar oleh pihak lawan. Rajah 8 menunjukkan ketinggian bola,  $h$  meter, selepas  $t$  saat diberi oleh fungsi  $h(t) = -\frac{1}{3}t^2 + 2t + 2$ . Ketinggian maksimum yang dicapai oleh bola tersebut ialah pada  $\left(3p, \frac{5}{p}\right)$ .

*In a football match, a player performs a throw-in after the ball goes out of play by the opposing team. Diagram 8 shows the height of the ball,  $h$  metres, after  $t$  seconds is given by a function  $h(t) = -\frac{1}{3}t^2 + 2t + 2$ . The maximum height reached by the ball occurs at  $\left(3p, \frac{5}{p}\right)$ .*



Rajah 8

Diagram 8

- (a) Dengan menggunakan kaedah penyempurnaan kuasa dua, ungkapkan  $h(t)$  dalam bentuk verteks. Seterusnya, cari nilai  $p$ .  
*By using the method of completing the square, express  $h(t)$  in vertex form. Hence, find the value of  $p$ .*
- (b) Lakarkan graf  $h(t)$  untuk  $0 \leq t \leq 6$ .  
*Sketch the graph of  $h(t)$  for  $0 \leq t \leq 6$ .*
- (c) Pada saat ke berapakah bola cecah ke tanah semula.  
*At what time does the ball hit the ground again.*

[4 markah]

[4 marks]

[2 markah]

[2 marks]

[2 markah]

[2 marks]

**SULIT****3472/1****Jawapan / Answer:**

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$$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

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**SERTAI TELEGRAM @exercise\_students**

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**SULIT**

SULIT

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- 14 (a) Jika  $a$  ialah sebutan pertama dan  $d$  ialah beza sepunya bagi suatu jangjang aritmetik, tunjukkan bahawa hasil tambah  $n$  sebutan pertama bagi jangjang itu ialah

*If  $a$  is the first term and  $d$  is the common difference of an arithmetic progression, show that the sum of the first  $n$  terms of the progression is*

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

[3 markah]

[3 marks]

- (b)  $x$ ,  $y$  dan  $z$  ialah tiga sebutan pertama dalam suatu jangjang aritmetik di mana  $x$  dan  $z$  ialah dua nombor gandaan 15 yang berturutan.

*$x$ ,  $y$  and  $z$  are the first three terms in an arithmetic progression where  $x$  and  $z$  are two consecutive multiples of 15.*

Cari

Find

- (i) beza sepunya,  
*common difference,*

[2 markah]

[2 marks]

- (ii) nilai  $x$  jika  $3z = 2(x + y)$ .  
*value of  $x$  if  $3z = 2(x + y)$ .*

[3 markah]

[3 marks]

Jawapan / Answer:

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- 15 (a) (i) Terbitkan rumus sudut berganda  $\sin 2\theta = 2 \sin \theta \cos \theta$ .  
*Derive the double angle formula  $\sin 2\theta = 2 \sin \theta \cos \theta$ .*

[2 markah]

[2 marks]

- (ii) Seterusnya, selesaikan persamaan  $4 \sin \theta \cos \theta = 1$  untuk  $0^\circ \leq \theta \leq 360^\circ$ .

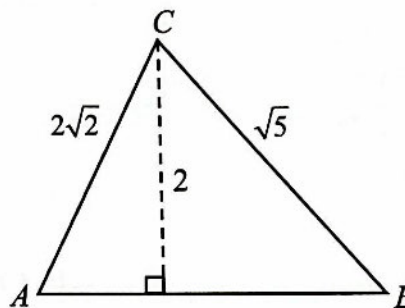
*Hence, solve the equation  $4 \sin \theta \cos \theta = 1$  for  $0^\circ \leq \theta \leq 360^\circ$ .*

[3 markah]

[3 marks]

- (b) Rajah 9 menunjukkan sebuah segitiga  $ABC$ .

*Diagram 9 shows a triangle  $ABC$ .*



Rajah 9

Diagram 9

Berdasarkan segitiga  $ABC$ , cari nilai  $\tan(A + B)$  tanpa menggunakan kalkulator.

*Based on triangle  $ABC$ , find the value of  $\tan(A + B)$  without using calculator.*

[3 markah]

[3 marks]

Jawapan / Answer:

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KEBARANGKALIAN HUJUNG ATAS  $Q(z)$  BAGI TABURAN NORMAL  $N(0, 1)$ THE UPPER TAIL PROBABILITY  $Q(z)$  FOR THE NORMAL DISTRIBUTION  $N(0, 1)$ 

| z   | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | Minus / Tolak |   |    |    |    |    |    |    |    |
|-----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------------|---|----|----|----|----|----|----|----|
| 0.0 | .5000  | .4960  | .4920  | .4880  | .4840  | .4801  | .4761  | .4721  | .4681  | .4641  | 4             | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 |
| 0.1 | .4602  | .4562  | .4522  | .4483  | .4443  | .4404  | .4364  | .4325  | .4286  | .4247  | 4             | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 |
| 0.2 | .4207  | .4168  | .4129  | .4090  | .4052  | .4013  | .3974  | .3936  | .3897  | .3859  | 4             | 8 | 12 | 15 | 19 | 23 | 27 | 31 | 35 |
| 0.3 | .3821  | .3783  | .3745  | .3707  | .3669  | .3632  | .3594  | .3557  | .3520  | .3483  | 4             | 7 | 11 | 15 | 19 | 22 | 26 | 30 | 34 |
| 0.4 | .3446  | .3409  | .3372  | .3336  | .3300  | .3264  | .3228  | .3192  | .3156  | .3121  | 4             | 7 | 11 | 15 | 18 | 22 | 25 | 29 | 32 |
| 0.5 | .3085  | .3050  | .3015  | .2981  | .2946  | .2912  | .2877  | .2843  | .2810  | .2776  | 3             | 7 | 10 | 14 | 17 | 20 | 24 | 27 | 31 |
| 0.6 | .2743  | .2709  | .2676  | .2643  | .2611  | .2578  | .2546  | .2514  | .2483  | .2451  | 3             | 7 | 10 | 13 | 16 | 19 | 23 | 26 | 29 |
| 0.7 | .2420  | .2389  | .2358  | .2327  | .2296  | .2266  | .2236  | .2206  | .2177  | .2148  | 3             | 6 | 9  | 12 | 15 | 18 | 21 | 24 | 27 |
| 0.8 | .2119  | .2090  | .2061  | .2033  | .2005  | .1977  | .1949  | .1922  | .1894  | .1867  | 3             | 5 | 8  | 11 | 14 | 16 | 19 | 22 | 25 |
| 0.9 | .1841  | .1814  | .1788  | .1762  | .1736  | .1711  | .1685  | .1660  | .1635  | .1611  | 3             | 5 | 8  | 10 | 13 | 15 | 18 | 20 | 23 |
| 1.0 | .1587  | .1562  | .1539  | .1515  | .1492  | .1469  | .1446  | .1423  | .1401  | .1379  | 2             | 5 | 7  | 9  | 12 | 14 | 16 | 19 | 21 |
| 1.1 | .1357  | .1335  | .1314  | .1292  | .1271  | .1251  | .1230  | .1210  | .1190  | .1170  | 2             | 4 | 6  | 8  | 10 | 12 | 14 | 16 | 18 |
| 1.2 | .1151  | .1131  | .1112  | .1093  | .1075  | .1056  | .1038  | .1020  | .1003  | .0985  | 2             | 4 | 6  | 7  | 9  | 11 | 13 | 15 | 17 |
| 1.3 | .0968  | .0951  | .0934  | .0918  | .0901  | .0885  | .0869  | .0853  | .0838  | .0823  | 2             | 3 | 5  | 6  | 8  | 10 | 11 | 13 | 14 |
| 1.4 | .0808  | .0793  | .0778  | .0764  | .0749  | .0735  | .0721  | .0708  | .0694  | .0681  | 1             | 3 | 4  | 6  | 7  | 8  | 10 | 11 | 13 |
| 1.5 | .0668  | .0655  | .0643  | .0630  | .0618  | .0606  | .0594  | .0582  | .0571  | .0559  | 1             | 2 | 4  | 5  | 6  | 7  | 8  | 10 | 11 |
| 1.6 | .0548  | .0537  | .0526  | .0516  | .0505  | .0495  | .0485  | .0475  | .0465  | .0455  | 1             | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
| 1.7 | .0446  | .0436  | .0427  | .0418  | .0409  | .0401  | .0392  | .0384  | .0375  | .0367  | 1             | 2 | 3  | 4  | 4  | 5  | 6  | 7  | 8  |
| 1.8 | .0359  | .0351  | .0344  | .0336  | .0329  | .0322  | .0314  | .0307  | .0301  | .0294  | 1             | 1 | 2  | 3  | 4  | 4  | 5  | 6  | 6  |
| 1.9 | .0287  | .0281  | .0274  | .0268  | .0262  | .0256  | .0250  | .0244  | .0239  | .0233  | 1             | 1 | 2  | 2  | 3  | 4  | 4  | 5  | 5  |
| 2.0 | .0228  | .0222  | .0217  | .0212  | .0207  | .0202  | .0197  | .0192  | .0188  | .0183  | 0             | 1 | 1  | 2  | 2  | 3  | 3  | 4  | 4  |
| 2.1 | .0179  | .0174  | .0170  | .0166  | .0162  | .0158  | .0154  | .0150  | .0146  | .0143  | 0             | 1 | 1  | 2  | 2  | 2  | 3  | 3  | 4  |
| 2.2 | .0139  | .0136  | .0132  | .0129  | .0125  | .0122  | .0119  | .0116  | .0113  | .0110  | 0             | 1 | 1  | 1  | 2  | 2  | 2  | 3  | 3  |
| 2.3 | .0107  | .0104  | .0102  |        |        |        |        |        |        |        | 0             | 1 | 1  | 1  | 1  | 2  | 2  | 2  | 2  |
|     |        |        |        | .02990 | .02964 | .02939 | .02914 |        |        |        | 3             | 5 | 8  | 10 | 13 | 15 | 18 | 20 | 23 |
|     |        |        |        |        |        |        |        | .02889 | .02866 | .02842 | 2             | 5 | 7  | 9  | 12 | 14 | 16 | 16 | 21 |
| 2.4 | .02820 | .02798 | .02776 | .02755 | .02734 |        |        |        |        |        | 2             | 4 | 6  | 8  | 11 | 13 | 15 | 17 | 19 |
|     |        |        |        |        | .02714 | .02695 |        | .02676 | .02657 | .02639 | 2             | 4 | 6  | 7  | 9  | 11 | 13 | 15 | 17 |
| 2.5 | .02621 | .02604 | .02587 | .02570 | .02554 | .02539 | .02523 | .02508 | .02494 | .02480 | 2             | 3 | 5  | 6  | 8  | 9  | 11 | 12 | 14 |
| 2.6 | .02466 | .02453 | .02440 | .02427 | .02415 | .02402 | .02391 | .02379 | .02368 | .02357 | 1             | 2 | 3  | 5  | 6  | 7  | 9  | 9  | 10 |
| 2.7 | .02347 | .02336 | .02326 | .02317 | .02307 | .02298 | .02289 | .02280 | .02272 | .02264 | 1             | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
| 2.8 | .02256 | .02248 | .02240 | .02233 | .02226 | .02219 | .02212 | .02205 | .02199 | .02193 | 1             | 1 | 2  | 3  | 4  | 4  | 5  | 6  | 6  |
| 2.9 | .02187 | .02181 | .02175 | .02169 | .02164 | .02159 | .02154 | .02149 | .02144 | .02139 | 0             | 1 | 1  | 2  | 2  | 3  | 3  | 4  | 4  |
| 3.0 | .02135 | .02131 | .02126 | .02122 | .02118 | .02114 | .02111 | .02107 | .02104 | .02100 | 0             | 1 | 1  | 2  | 2  | 2  | 3  | 3  | 4  |

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