

3472/1  
Matematik Tambahan  
Kertas 1  
Ogos 2024  
2 jam

Nama : .....  
Tingkatan : .....

**MODUL GUNA SAMA PERCUBAAN SPM 2024  
TINGKATAN 5**

**MATEMATIK TAMBAHAN  
KERTAS 1  
Dua jam**

**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

- 1. Tulis nama dan tingkatan 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 dalam bahasa Inggeris atau bahasa Melayu.
- 5. Kertas soalan ini mengandungi 15 soalan.
- 6. Jawab **semua** soalan di **Bahagian A** dan **2 soalan** di **Bahagian B**.
- 7. Tulis jawapan anda dalam ruangan yang disediakan dalam kertas soalan.
- 8. Tunjukkan langkah-langkah penting dalam kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.
- 9. Satu senarai rumus disediakan di halaman 2 hingga 3.
- 10. Anda dibenarkan menggunakan kalkulator saintifik.

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

Kertas soalan ini mengandungi 22 halaman bercetak

Lihat halaman sebelah  
**SULIT**

# RUMUS FORMULAE

Rumus-rumus berikut boleh membantu anda menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunakan.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

17. Luas di bawah lengkung

*Area under a curve*

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

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

18. Isi padu kisaran

*Volume of revolution*

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

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

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

$$20. \bar{I} = \frac{\sum w_i I_i}{\sum w_i}$$

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

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

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

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

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

$$26. Z = \frac{x-\mu}{\sigma}$$

27. Panjang lengkok,  $s = j\theta$

*Arc length,  $s = r\theta$*

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

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

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

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

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

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

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

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

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

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

$$33. \cos 2A = \cos^2 A - \sin^2 A$$

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

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

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

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

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

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

$$35. \sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$$

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

$$36. \cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$

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

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

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

$$39. a^2 = b^2 + c^2 - 2bc \cos A$$

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

$$40. \text{Luas segitiga / Area of triangle}$$

$$= \frac{1}{2} ab \sin C$$

$$41. \text{Titik yang membahagi suatu tembereng garis}$$

$$A \text{ point dividing a segment of a line}$$

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

$$42. \text{Luas segi tiga / Area of triangle}$$

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

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

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



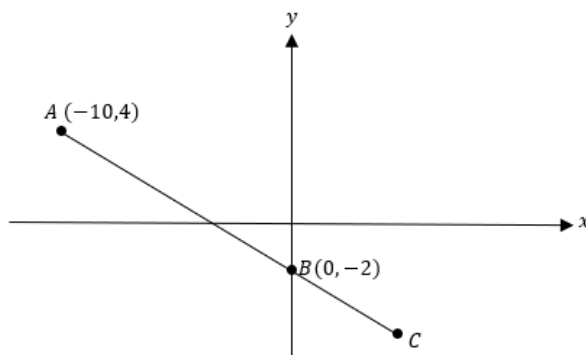
BAHAGIAN A  
Jawab **semua** soalan  
Answer **all** questions

|                                          |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>1</b>                                 | <p>Sebutan pertama janjang geometri melebihi sebutan kedua sebanyak 8 dan hasil tambah hingga ketakterhinggaan ialah 18. Cari nisbah sepunya janjang itu.</p> <p><i>The first term of a geometric progression exceeds the second term by 8 and the sum to infinity is 18. Find the common ratio of the progression.</i></p> <p style="text-align: right;">[3 markah/ marks]</p> <p>Answer/ Jawapan :</p> |  |
| <b>JUMLAH MARKAH BAGI MUKA SURAT INI</b> |                                                                                                                                                                                                                                                                                                                                                                                                          |  |

Lihat halaman sebelah  
**SULIT**

- 2 Rajah 2 menunjukkan garis lurus AC yang bersilang dengan paksi-y pada titik B. Diberi bahawa  $AB = 3BC$ .

*Diagram 2 shows the straight line AC which intersects the y-axis at point B. Given that  $AB = 3BC$ .*



Rajah 2 / Diagram 2

*Cari/Find*

- koordinat C,  
*the coordinates of C,*
- persamaan garis lurus yang melalui titik A dan berserenjang dengan AC.  
*the equation of the straight line which passes through point A and is perpendicular to AC.*

[5 markah/marks]

*Jawapan/answer:*

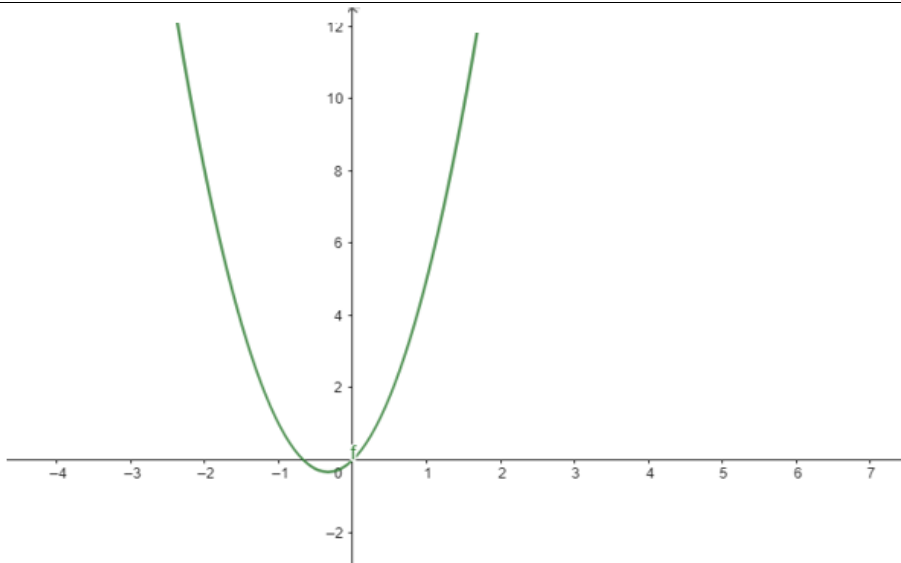
(a)

(b)

JUMLAH MARKAH BAGI MUKA SURAT INI

Lihat halaman sebelah  
**SULIT**

3



- a) Graf di atas adalah graf fungsi  $y = 3x^2 + 2x$ . Jika hubungan linear  $y = -x + 4$  dilakar pada graf yang sama, pada nilai  $x$  manakah graf ini akan bertemu?

*The graph above is a function graph  $y = 3x^2 + 2x$ . If the linear relationship  $y = -x + 4$  is drawn on the same graph, at what value of  $x$  will these graphs meet?*

[2 markah/ marks]

Jawapan/ Answer :

JUMLAH MARKAH BAGI MUKA SURAT INI

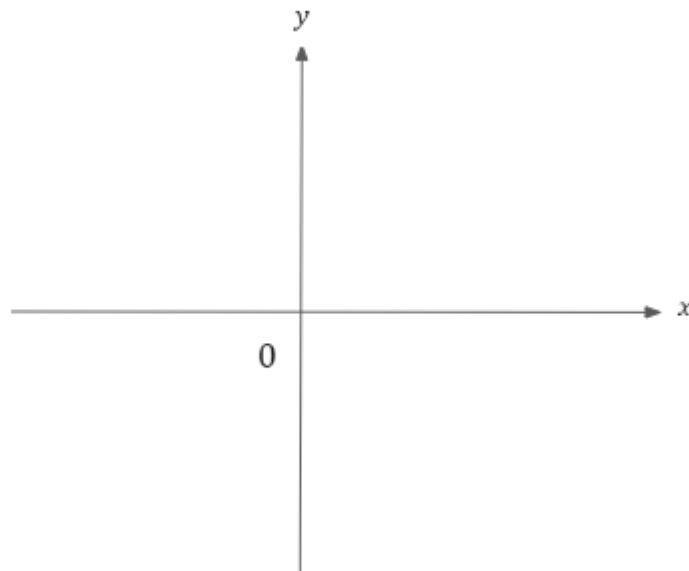
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**SULIT**

- 4 b) Seorang pemain bola sepak menendang bola dan ketinggian  $h$  bola tersebut selepas  $t$  saat dinyatakan sebagai  $h = 16 - 4t^2$ . Lakarkan graf  $h = 16 - 4t^2$  pada ruangan jawapan dan tentukan bila  $h = 0$ .

*A soccer player kicks the ball and height  $h$  of the ball after  $t$  seconds is expressed as  $h = 16 - 4t^2$ . Sketch the graph of  $h = 16 - 4t^2$  in the answer column and determine  $h = 0$ .*

[2 markah/ marks]

Jawapan/ Answer :



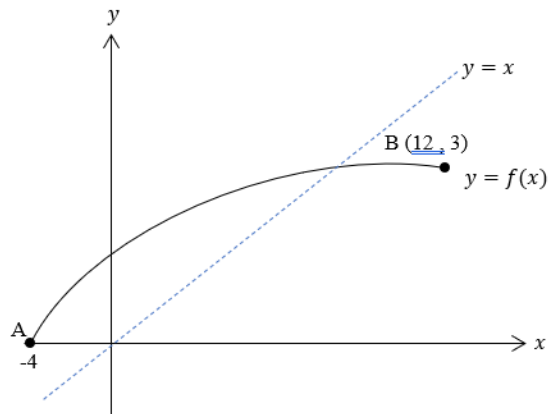
JUMLAH MARKAH BAGI MUKA SURAT INI

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|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 5                                 | <p>Sebuah kereta bergerak dari titik P (7, 24) dengan vektor halaju <math>\underline{v} = 8\underline{i} - 4\underline{j}</math> kms<sup>-1</sup>. Selepas t saat meninggalkan P, kereta berada di titik Q dengan keadaan <math>\overrightarrow{OQ} = \overrightarrow{OP} + t\underline{v}</math>.</p> <p><i>The car is moved from point P (7, 24) with the velocity vector <math>\underline{v} = 8\underline{i} - 4\underline{j}</math> kms<sup>-1</sup>. After t second leaving Q, the car is at point Q, where <math>\overrightarrow{OQ} = \overrightarrow{OP} + t\underline{v}</math>.</i></p> <p>a) Cari vektor unit dalam arah <math>\overrightarrow{PO}</math>.</p> <p><i>Find the unit of vector in direction of <math>\overrightarrow{PO}</math>.</i> [2 markah/ marks]</p> <p>b) Cari laju dan kedudukan kereta itu dari P selepas 10 saat.</p> <p><i>Find the speed and the position of the car after 10 seconds</i> . [3 markah/ marks]</p> <p>c) Bilakah kereta tersebut akan berada di timur titik asalan.</p> <p>[ Andaikan utara ditunjukkan oleh paksi-y ]</p> <p><i>When will the car be at the east side of the origin.</i></p> <p>[ Assume north pointed by y-axis ] [2 markah/ marks]</p> <p>Jawapan/Answer:</p> <p>a)</p> <p>b)</p> <p>c)</p> |  |
| JUMLAH MARKAH BAGI MUKA SURAT INI |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |

6 Rajah 6 menunjukkan garis  $y = x$  dan graf bagi  $y = f(x)$ .

Diagram 6 shows a line of  $y = x$  and a graph for  $y = f(x)$ .



- (a) Pada rajah yang sama, lakarkan graf  $y = f^{-1}(x)$  dengan menunjukkan titik-titik yang sepadan dengan titik A dan B.

*At the same diagram, sketch the graph of  $y = f^{-1}(x)$  by indicating the corresponding point of A and B.*

- (b) Nyatakan koordinat bagi titik-titik sepadan bagi titik A dan B pada graf  $y = f^{-1}(x)$  tersebut.

*State the coordinate of the corresponding point A and B in the graph of  $y = f^{-1}(x)$ .*

[4 markah/marks]

Jawapan/answer:

JUMLAH MARKAH BAGI MUKA SURAT INI

Lihat halaman sebelah  
SULIT

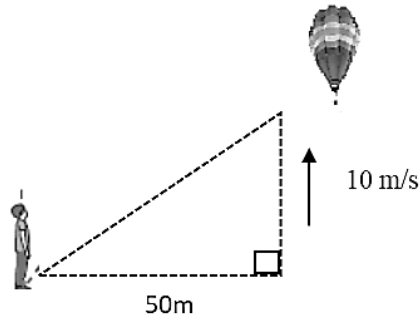
|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 7                                 | <p>Diberi lengkung bagi fungsi kuadratik <math>g(x) = (x - 3h)^2 - 2k</math> menyilang pada paksi-x pada <math>(-1,0)</math> dan <math>(9,0)</math> dan garis lurus <math>x = 4</math> melalui titik minimum lengkung itu.</p> <p><i>Given the curve of the quadratic function <math>g(x) = (x - 3h)^2 - 2k</math> intersects the x-axis at <math>(-1,0)</math> and <math>(9,0)</math> and the straight line <math>x = 4</math> passes through the minimum point of the curve .</i></p> <p>a) Cari nilai <math>h</math> dan <math>k</math>.<br/> <i>Find the value of <math>h</math> and <math>k</math>.</i> [2 markah/marks]</p> <p>b) Seterusnya lakar graf <math>g(x)</math> untuk <math>-2 \leq x \leq 10</math><br/> <i>Hence, sketch the graph <math>g(x)</math> for <math>-2 \leq x \leq 10</math></i> [3 markah/marks]</p> <p>c) Tulis persamaan bagi lengkung itu jika graf itu dipantulkan pada paksi-y.<br/> <i>Write an equation for the curve if the graph is reflected on the y-axis.</i> [1 markah/marks]</p> <p>Jawapan/Answer:</p> <p>a)</p> <p>b)</p> <p>c)</p> |  |
| JUMLAH MARKAH BAGI MUKA SURAT INI |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |

|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 8                                 | <p>a) Satu pasukan pertandingan bola keranjang bermain 3 perlawanan. <math>X</math> ialah bilangan kali pasukan itu menang. Senaraikan semua nilai yang mungkin bagi pemboleh ubah rawak diskret <math>X</math>.<br/> <i>A basketball team plays 3 games. <math>X</math> is the number of times the team wins.<br/> List all the possible values of the discrete random variables.</i> [1 markah/marks]</p> <p>b) Dalam sebuah kelas, 45% daripada murid suka bermain bola keranjang. Satu sample yang terdiri daripada 8 orang murid dipilih secara rawak. Cari kebarangkalian bahawa tepat 3 orang daripada sampel itu yang suka bermain bola keranjang.<br/> <i>In a class, 45% of the students like to play basketball. A sample of 8 students is chosen at random. Find the probability that exactly 3 students from the sample like to play basketball.</i> [3 markah/marks]</p> <p>Jawapan/Answer:</p> <p>(a)</p> <p>(b)</p> |  |
| JUMLAH MARKAH BAGI MUKA SURAT INI |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |

**Lihat halaman sebelah**  
**SULIT**

- 10 a) Rajah menunjukkan satu belon udara panas sedang naik secara menegak pada kadar tetap 10 m/s. Seseorang di tanah berdiri 50 meter dari titik tepat di bawah belon. Cari kadar perubahan jarak antara orang dan belon apabila belon berada 40 meter di atas tanah.  
*The diagram shows a hot air balloon is rising vertically at a constant rate of 10 m/s. A person on the ground is standing 50 meters away from the point directly beneath the balloon. Find the rate of change of the distance between the person and the balloon when the balloon is 40 meters above the ground*

[4 markah/4 marks]



Jawapan / Answer :

(a)

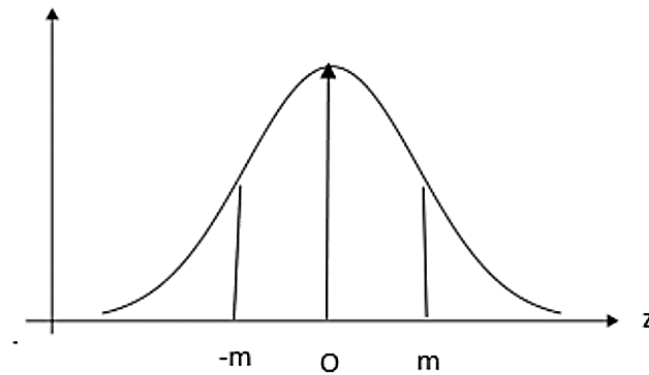
JUMLAH MARKAH BAGI MUKA SURAT INI

Lihat halaman sebelah  
**SULIT**

|                                   |                                                                                                                                                                                                                                                                                                                                                                              |  |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 10                                | <p>b) Diberi <math>y = \frac{x}{3x-5}</math>. Tunjukkan <math>\frac{dy}{dx} = -\frac{5}{(3x-5)^2}</math>.</p> <p>Seterusnya, cari <math>\int \frac{1}{(3x-5)^2} dx</math>.</p> <p>Given <math>= \frac{x}{3x-5}</math>. Show that <math>\frac{dy}{dx} = -\frac{5}{(3x-5)^2}</math>.</p> <p>Hence, find <math>\int \frac{1}{(3x-5)^2} dx</math>.</p> <p>Jawapan / Answer :</p> |  |
| JUMLAH MARKAH BAGI MUKA SURAT INI |                                                                                                                                                                                                                                                                                                                                                                              |  |

**Lihat halaman sebelah**  
**SULIT**

12 a)



Rajah 12 (a)/ Diagram 12 (a)

Rajah 12 menunjukkan graf taburan normal piawai. Pada rajah di atas lorekkan rantau-rantau untuk mewakili  $P(|Z| \leq m)$

Diagram 12 shows the standard normal distribution graph. On the diagram above, shade the regions to represent  $P(|Z| \leq m)$

[ 1 markah / mark ]

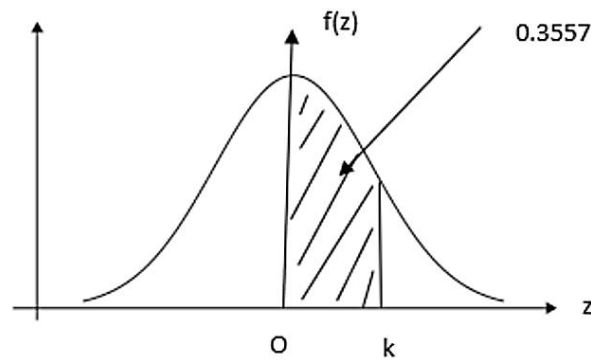
Jawapan / Answer :

(a)

JUMLAH MARKAH BAGI MUKA SURAT INI

Lihat halaman sebelah  
SULIT

12 b)



Rajah 12(b) / Diagram 12 (b)

Rajah 12(b) menunjukkan graf taburan normal piawai. Kebarangkalian yang diwakili oleh kawasan berlorek ialah 0.3557

Diagram 12(b) shows a standard normal distribution graph. The probability represented by the area of the shaded region is 0.3557

- i. Cari nilai  $k$  / Find the value of  $k$

[ 2 markah / marks ]

- ii.  $X$  ialah pembolehubah rawak selanjar yang bertabur secara normal dengan min 69 dan sisihan piawai 3. Cari nilai bagi  $X$  jika skor- $Z$  ialah  $k$ .

$X$  is a normally distributed continuous random variable with mean 69 and standard deviation 3. Find the value of  $X$  if the  $Z$ -score is  $k$

[ 3 markah / marks ]

Jawapan / Answer:

(b) i.

ii.

JUMLAH MARKAH BAGI MUKA SURAT INI

Lihat halaman sebelah  
**SULIT**

## BAHAGIAN B

Answer 2 questions

Jawab mana-mana 2 soalan

- 13 Selesaikan persamaan serentak yang berikut dengan menggunakan perwakilan graf bagi domain  $-3 \leq x \leq 3$ . Seterusnya tentukan penyelesaian persamaan serentak berikut  
*Solve the following simultaneous equations using the graphical representation method with domain  $-3 \leq x \leq 3$ . Next, determine the solution of the following simultaneous equation.*

$$\begin{aligned}x - y &= 2 \\ 4x^2 + 3y^2 &= 36\end{aligned}$$

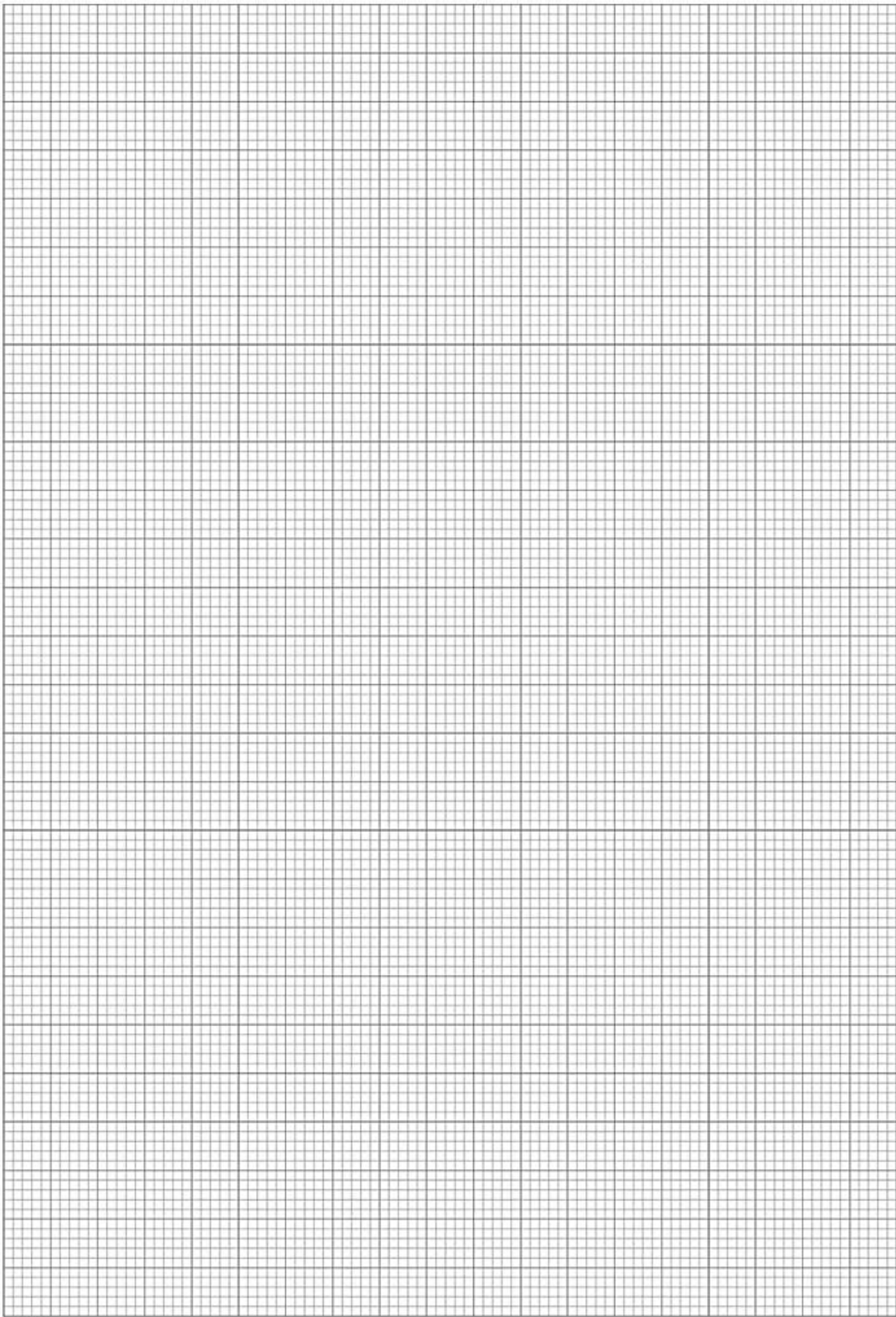
[8 Markah/Marks]

Jawapan/Answer:

| $x$                | -3 | -2 | -1 | 0          | 1 | 2 | 3 |
|--------------------|----|----|----|------------|---|---|---|
| $x - y = 2$        |    |    |    | -1         |   |   |   |
| $4x^2 + 3y^2 = 36$ |    |    |    | $\pm 3.26$ |   |   |   |

JUMLAH MARKAH BAGI MUKA SURAT INI

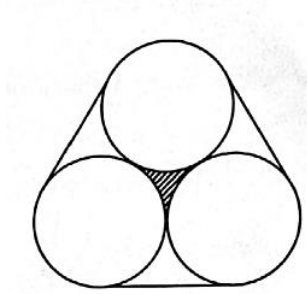
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|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 14                                | <p>(a) Selesaikan persamaan <math>2e^{3x+1} = 9e^{2-x}</math>.<br/>Solve the equation <math>2e^{3x+1} = 9e^{2-x}</math>. [3 markah/ marks]</p> <p>(b) Rajah di bawah menunjukkan sebuah segi tiga bersudut tegak. Cari luas dan perimeter segi tiga bersudut tegak itu.<br/>The diagram below shows a right-angled triangle. Find the area and the perimeter of the right-angled triangle.</p> <div> </div> <p>[5 markah/ marks]</p> <p>Jawapan/ Answer:</p> <p>(a)</p> <p>(b)</p> |  |
| JUMLAH MARKAH BAGI MUKA SURAT INI |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |

- 15 Rajah 15 menunjukkan keratan rentas tiga bekas silinder, masing-masing berjari 3 cm, diikat dengan getah yang diregangkan. [Gunakan  $\pi = 3.142$ ]  
 Diagram 15 shows the cross-section of three cylindrical containers, each of radius 3 cm, held together by a stretched elastic band. [Use  $\pi = 3.142$ ]



Rajah 15  
Diagram 15

Cari  
Find

- (a) luas kawasan berlorek  
the shaded area.

[4 markah/marks]

- (b) Panjang getah yang diregangkan.  
the length of stretched elastic band

[4 markah/marks]

Jawapan/ Answer:

(a)

(b)

JUMLAH MARKAH BAGI MUKA SURAT INI

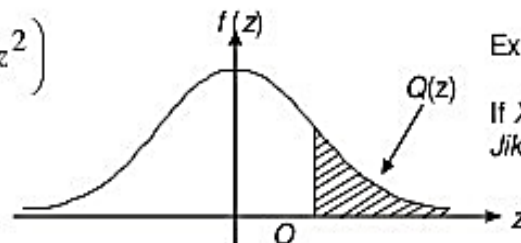
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**THE UPPER TAIL PROBABILITY  $Q(z)$  FOR THE NORMAL DISTRIBUTION  $N(0,1)$   
KEBARANGKALIAN Hujung Atas  $Q(z)$  BAGI TABURAN NORMAL  $N(0, 1)$**

| $z$ | 0       | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | Minus / Total |   |    |    |    |    |    |    |    |
|-----|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------------|---|----|----|----|----|----|----|----|
| 0.0 | 0.5000  | 0.4960  | 0.4920  | 0.4880  | 0.4840  | 0.4801  | 0.4761  | 0.4721  | 0.4681  | 0.4641  | 4             | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 |
| 0.1 | 0.4602  | 0.4562  | 0.4522  | 0.4483  | 0.4443  | 0.4404  | 0.4364  | 0.4325  | 0.4286  | 0.4247  | 4             | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 |
| 0.2 | 0.4207  | 0.4168  | 0.4129  | 0.4090  | 0.4052  | 0.4013  | 0.3974  | 0.3936  | 0.3897  | 0.3859  | 4             | 8 | 12 | 15 | 19 | 23 | 27 | 31 | 35 |
| 0.3 | 0.3821  | 0.3783  | 0.3745  | 0.3707  | 0.3669  | 0.3632  | 0.3594  | 0.3557  | 0.3520  | 0.3483  | 4             | 7 | 11 | 15 | 19 | 22 | 26 | 30 | 34 |
| 0.4 | 0.3446  | 0.3409  | 0.3372  | 0.3336  | 0.3300  | 0.3264  | 0.3228  | 0.3192  | 0.3156  | 0.3121  | 4             | 7 | 11 | 15 | 18 | 22 | 25 | 29 | 32 |
| 0.5 | 0.3085  | 0.3050  | 0.3015  | 0.2981  | 0.2946  | 0.2912  | 0.2877  | 0.2843  | 0.2810  | 0.2776  | 3             | 7 | 10 | 14 | 17 | 20 | 24 | 27 | 31 |
| 0.6 | 0.2743  | 0.2709  | 0.2676  | 0.2643  | 0.2611  | 0.2578  | 0.2546  | 0.2514  | 0.2483  | 0.2451  | 3             | 7 | 10 | 13 | 16 | 19 | 23 | 26 | 29 |
| 0.7 | 0.2420  | 0.2389  | 0.2358  | 0.2327  | 0.2296  | 0.2266  | 0.2236  | 0.2206  | 0.2177  | 0.2148  | 3             | 6 | 9  | 12 | 15 | 18 | 21 | 24 | 27 |
| 0.8 | 0.2119  | 0.2090  | 0.2061  | 0.2033  | 0.2005  | 0.1977  | 0.1949  | 0.1922  | 0.1894  | 0.1867  | 3             | 5 | 8  | 11 | 14 | 16 | 19 | 22 | 25 |
| 0.9 | 0.1841  | 0.1814  | 0.1788  | 0.1762  | 0.1736  | 0.1711  | 0.1685  | 0.1660  | 0.1635  | 0.1611  | 3             | 5 | 8  | 10 | 13 | 15 | 18 | 20 | 23 |
| 1.0 | 0.1587  | 0.1562  | 0.1539  | 0.1515  | 0.1492  | 0.1469  | 0.1446  | 0.1423  | 0.1401  | 0.1379  | 2             | 5 | 7  | 9  | 12 | 14 | 16 | 19 | 21 |
| 1.1 | 0.1357  | 0.1335  | 0.1314  | 0.1292  | 0.1271  | 0.1251  | 0.1230  | 0.1210  | 0.1190  | 0.1170  | 2             | 4 | 6  | 8  | 10 | 12 | 14 | 16 | 18 |
| 1.2 | 0.1151  | 0.1131  | 0.1112  | 0.1093  | 0.1075  | 0.1056  | 0.1038  | 0.1020  | 0.1003  | 0.0985  | 2             | 4 | 6  | 7  | 9  | 11 | 13 | 15 | 17 |
| 1.3 | 0.0968  | 0.0951  | 0.0934  | 0.0918  | 0.0901  | 0.0885  | 0.0869  | 0.0853  | 0.0838  | 0.0823  | 2             | 3 | 5  | 6  | 8  | 10 | 11 | 13 | 14 |
| 1.4 | 0.0808  | 0.0793  | 0.0778  | 0.0764  | 0.0749  | 0.0735  | 0.0721  | 0.0708  | 0.0694  | 0.0681  | 1             | 3 | 4  | 6  | 7  | 8  | 10 | 11 | 13 |
| 1.5 | 0.0668  | 0.0655  | 0.0643  | 0.0630  | 0.0618  | 0.0606  | 0.0594  | 0.0582  | 0.0571  | 0.0559  | 1             | 2 | 4  | 5  | 6  | 7  | 8  | 10 | 11 |
| 1.6 | 0.0548  | 0.0537  | 0.0526  | 0.0516  | 0.0505  | 0.0495  | 0.0485  | 0.0475  | 0.0465  | 0.0455  | 1             | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
| 1.7 | 0.0446  | 0.0436  | 0.0427  | 0.0418  | 0.0409  | 0.0401  | 0.0392  | 0.0384  | 0.0375  | 0.0367  | 1             | 2 | 3  | 4  | 4  | 5  | 6  | 7  | 8  |
| 1.8 | 0.0359  | 0.0351  | 0.0344  | 0.0336  | 0.0329  | 0.0322  | 0.0314  | 0.0307  | 0.0301  | 0.0294  | 1             | 1 | 2  | 3  | 4  | 4  | 5  | 6  | 6  |
| 1.9 | 0.0287  | 0.0281  | 0.0274  | 0.0268  | 0.0262  | 0.0256  | 0.0250  | 0.0244  | 0.0239  | 0.0233  | 1             | 1 | 2  | 2  | 3  | 4  | 4  | 5  | 5  |
| 2.0 | 0.0228  | 0.0222  | 0.0217  | 0.0212  | 0.0207  | 0.0202  | 0.0197  | 0.0192  | 0.0188  | 0.0183  | 0             | 1 | 1  | 2  | 2  | 3  | 3  | 4  | 4  |
| 2.1 | 0.0179  | 0.0174  | 0.0170  | 0.0166  | 0.0162  | 0.0158  | 0.0154  | 0.0150  | 0.0146  | 0.0143  | 0             | 1 | 1  | 2  | 2  | 2  | 3  | 3  | 4  |
| 2.2 | 0.0139  | 0.0136  | 0.0132  | 0.0129  | 0.0125  | 0.0122  | 0.0119  | 0.0116  | 0.0113  | 0.0110  | 0             | 1 | 1  | 1  | 2  | 2  | 2  | 3  | 3  |
| 2.3 | 0.0107  | 0.0104  | 0.0102  |         |         |         |         |         |         |         | 0             | 1 | 1  | 1  | 1  | 2  | 2  | 2  | 2  |
|     |         |         |         | 0.00990 | 0.00964 | 0.00939 | 0.00914 |         |         |         | 3             | 5 | 8  | 10 | 13 | 15 | 18 | 20 | 23 |
|     |         |         |         |         |         |         |         | 0.00889 | 0.00866 | 0.00842 | 2             | 5 | 7  | 9  | 12 | 14 | 16 | 18 | 21 |
| 2.4 | 0.00820 | 0.00798 | 0.00776 | 0.00755 | 0.00734 |         |         |         |         |         | 2             | 4 | 6  | 8  | 11 | 13 | 15 | 17 | 19 |
|     |         |         |         |         |         | 0.00714 | 0.00695 | 0.00676 | 0.00657 | 0.00639 | 2             | 4 | 6  | 7  | 9  | 11 | 13 | 15 | 17 |
| 2.5 | 0.00621 | 0.00604 | 0.00587 | 0.00570 | 0.00554 | 0.00539 | 0.00523 | 0.00508 | 0.00494 | 0.00480 | 2             | 3 | 5  | 6  | 8  | 9  | 11 | 12 | 14 |
| 2.6 | 0.00466 | 0.00453 | 0.00440 | 0.00427 | 0.00415 | 0.00402 | 0.00391 | 0.00379 | 0.00368 | 0.00357 | 1             | 2 | 3  | 5  | 6  | 7  | 9  | 9  | 10 |
| 2.7 | 0.00347 | 0.00336 | 0.00326 | 0.00317 | 0.00307 | 0.00298 | 0.00289 | 0.00280 | 0.00272 | 0.00264 | 1             | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
| 2.8 | 0.00256 | 0.00248 | 0.00240 | 0.00233 | 0.00226 | 0.00219 | 0.00212 | 0.00205 | 0.00199 | 0.00193 | 1             | 1 | 2  | 3  | 4  | 4  | 5  | 6  | 6  |
| 2.9 | 0.00187 | 0.00181 | 0.00175 | 0.00169 | 0.00164 | 0.00159 | 0.00154 | 0.00149 | 0.00144 | 0.00139 | 0             | 1 | 1  | 2  | 2  | 3  | 3  | 4  | 4  |
| 3.0 | 0.00135 | 0.00131 | 0.00126 | 0.00122 | 0.00118 | 0.00114 | 0.00111 | 0.00107 | 0.00104 | 0.00100 | 0             | 1 | 1  | 2  | 2  | 2  | 3  | 3  | 4  |

$$f(z) = \frac{1}{\sqrt{2\pi}} \exp\left(-\frac{1}{2}z^2\right)$$

$$Q(z) = \int_z^{\infty} f(z) dz$$



Example / Contoh:

If  $X \sim N(0, 1)$ , then  $P(X > k) = Q(k)$   
Jika  $X \sim N(0, 1)$ , maka  $P(X > k) = Q(k)$