SULIT

3472/1

MAJLIS PENGETUA-PENGETUA SEKOLAH MALAYSIA (CAWANGAN PULAU PINANG)

MODUL BERFOKUS KBAT SPM

ANJURAN MPSM CAWANGAN PULAU PINANG

DENGAN KERJASAMA

SEKTOR PENGURUSAN AKADEMIK JABATAN PENDIDIKAN PULAU PINANG

ADDITIONAL MATHEMATICS 1
3472/1

1. *Tulis nama dan angka giliran anda pada ruang yang disediakan.*
2. *Kertas peperiksaan ini adalah dalam dwibahasa.*
3. *Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam Bahasa Inggeris atau Bahasa Melayu.*
5. *Calon dikehendaki membaca maklumat di halaman belakang.*

Untuk kegunaan pemeriksa		
Soalan	Markah Penuh	Markah Diperoleh
1	3	
2	3	
3	2	
4	4	
5	2	
6	4	
7	2	
8	4	
9	4	
10	2	
11	3	
12	4	
13	4	
14	3	
15	4	
16	4	
17	4	
18	2	
19	4	
20	3	
21	3	
22	2	
23	3	
24	4	
25	3	
Jumlah	80	

NAMA:.....

ANGKA GILIRAN:

BUKU SOALAN INI MENGANDUNGI **23** MUKA SURAT TERMASUK KULIT

[Lihat halaman sebelah

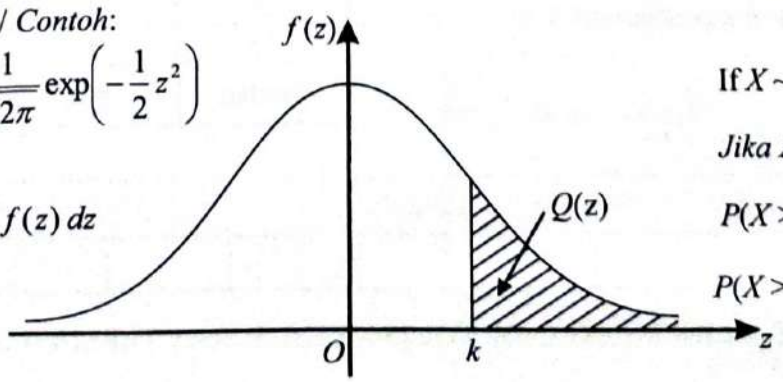
THE UPPER TAIL PROBABILITY $Q(z)$ FOR THE NORMAL DISTRIBUTION N(0, 1)
KEBARANGKALIAN HUJUNG ATAS $Q(z)$ BAGI TABURAN NORMAL N(0, 1)

z	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
											Minus / *Tolak*								
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	16	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

Example / *Contoh*:

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

$$Q(z) = \int_k^\infty f(z)\, dz$$



If $X \sim$ N(0, 1), then

Jika $X \sim$ N(0, 1), *maka*

$P(X > k) = Q(k)$

$P(X > 2.1) = Q(2.1) = 0.0179$

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 $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

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

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

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

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

6 $\log_a \dfrac{m}{n} = \log_a m - \log_a n$

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

8 $\log_a b = \dfrac{\log_c b}{\log_c a}$

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

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

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

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

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

CALCULUS
KALKULUS

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

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

3 $\dfrac{dy}{dx} = \dfrac{dy}{du} \times \dfrac{du}{dx}$

4 Area under a curve

Luas di bawah lengkung

$= \int_a^b y \, dx$ or (*atau*)

$= \int_a^b x \, dy$

5 Volume of revolution

Isi padu kisaran

$= \int_a^b \pi y^2 \, dx$ or (*atau*)

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

STATISTICS
STATISTIK

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

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

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

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

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

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

7 $\bar{I} = \dfrac{\sum W_i I_i}{\sum W_i}$

8 ${}^nP_r = \dfrac{n!}{(n-r)!}$

9 ${}^nC_r = \dfrac{n!}{(n-r)!r!}$

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

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

12 Mean / *Min*, $\mu = np$

13 $\sigma = \sqrt{npq}$

14 $Z = \dfrac{X - \mu}{\sigma}$

GEOMETRY
GEOMETRI

1 Distance /*Jarak*

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

2 Midpoint /*Titik tengah*

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

3 A point dividing a segment of a line
Titik yang membahagi suatu tembereng garis

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

4 Area of triangle /*Luas segi tiga*

$= \dfrac{1}{2}\left|(x_1y_2 + x_2y_3 + x_3y_1) - (x_2y_1 + x_3y_2 + x_1y_3)\right|$

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

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

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

$sin^2 A + kos^2 A = 1$

4 $\sec^2 A = 1 + \tan^2 A$

$sek^2 A = 1 + tan^2 A$

5 $\text{cosec}^2 A = 1 + \cot^2 A$

$kosek^2 A = 1 + kot^2 A$

6 $\sin 2A = 2 \sin A \cos A$

$sin\ 2A = 2\ sinA\ kosA$

7 $\cos 2A = \cos^2 A - \sin^2 A$

$= 2\cos^2 A - 1$

$= 1 - 2\sin^2 A$

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

$= 2\ kos^2 A - 1$

$= 1 - 2\ sin^2 A$

8 $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$

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

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

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

10 $\tan(A \pm B) = \dfrac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$

11 $\tan 2A = \dfrac{2\tan A}{1 - \tan^2 A}$

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

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

$a^2 = b^2 + c^2 - 2bc\ kosA.$

14 Area of triangle / *Luas segi tiga*

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

Answer ***all*** questions
*Jawab **semua** soalan*

1 Given $\frac{1}{2}p$ and $\frac{1}{2}q$ are the roots of quadratic equation $2x^2 - 3x + 1 = 0$. Form a quadratic equation which roots of $\frac{2}{p^2}$ and $\frac{2}{q^2}$.

Diberi $\frac{1}{2}p$ dan $\frac{1}{2}q$ ialah punca-punca persamaan kuadratik $2x^2 - 3x + 1 = 0$. Bentukkan satu persamaan kuadratik yang mempunyai punca-punca $\frac{2}{p^2}$ dan $\frac{2}{q^2}$.

[3 marks]
[3 *markah*]

Answer / *Jawapan*:

1

3

2 Ahmad took 4 minutes 20 second to complete the first kilometer run in. He could not sustain his stamina. His speed decreases uniformly for each subsequent kilometer. He took more than 20 seconds compared to the time for the previous kilometer. Find the time taken to complete the first 10 kilometers.

Ahmad mengambil masa 4 minit 20 saat *bagi kilometer yang pertama dalam suatu acara larian. Dia tidak dapat mengekalkan staminanya. Lajunya berkurang dengan sekata pada setiap kilometer yang berikutnya. Masa berlarinya* 20 saat *lebih bagi setiap kilometer berbanding larian sebelumnya. Cari masa yang diambil untuk menghabiskan* 10 kilometer *yang pertama.*

[3 marks]
[3 *markah*]

Answer / *Jawapan*:

2

3

3 Given that $\frac{p+1}{3}$, 6 and $3q$ are the first three terms of a geometric progression. Express the first term and the common ratio of the progression in terms of q.

[2 marks]

Diberi bahawa $\frac{p+1}{3}$, 6 *dan* $3q$ *ialah tiga sebutan pertama bagi suatu janjang geometri. Ungkapkan sebutan pertama dan nisbah sepunya janjang itu dalam sebutan* q.

[2 *markah*]

Answer / *Jawapan*:

3

2

4 Diagram 4 shows the curve $y = h(x)$. The straight line $y = -5$ is a tangent to the curve.

Rajah 4 menunjukkan lengkung $y = h(x)$. *Garis lurus ialah* $y = -5$ *tangen kepada lengkung tersebut.*

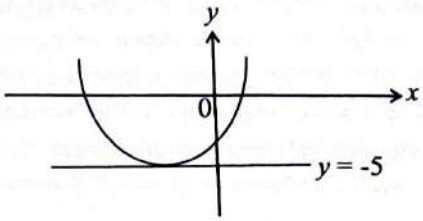


Diagram 4
Rajah 4

Given $h''(x) = 6$, find the equation of the curve when $h'(x) = 8$, and $x = 1$.

Diberi $h''(x) = 6$, *cari persamaan lengkung bila* $h'(x) = 8$, *dan* $x = 1$.

[4 marks]
[4 *markah*]

Answer / *Jawapan*:

4

4

5 Evaluate $\lim\limits_{x \to \infty} \dfrac{2x^2 + 3}{x^2 - 5x - 1}$.

Nilaikan $\underset{x \to \infty}{had} \dfrac{2x^2 + 3}{x^2 - 5x - 1}$.

[2 marks]
[2 *markah*]

Answer / *Jawapan*:

5

2

6 It is given that $y = 4x^2 + 3x - 2$.

Diberi bahawa $y = 4x^2 + 3x - 2$.

(a) Find the value of $\frac{dy}{dx}$ when $x = 2$.

Cari nilai bagi $\frac{dy}{dx}$ *apabila* $x = 2$.

(b) Express the approximate change in y in terms of k when x changes from 2 to $2 + k$ where k is a small value.

Ungkapkan perubahan kecil bagi y dalam sebutan k, apabila x berubah daripada 2 kepada 2 + k dengan keadaan k ialah nilai yang kecil

[4 marks]
[4 *markah*]

Answer / *Jawapan*:

(a)

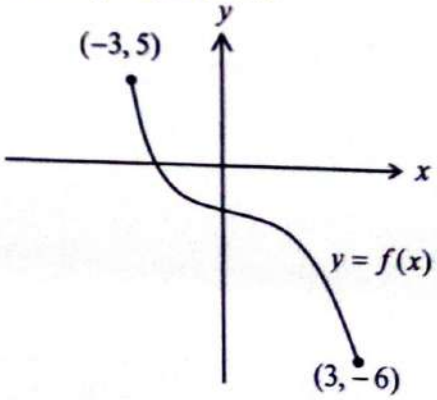
(b)

6

4

7 Determine the graph $y = f(x)$ shown below has an inverse or not. Give the reason for your answers.

Tentukan graf $y = f(x)$ *ditunjukkan di bawah mempunyai fungsi songsang atau tidak. Berikan sebab untuk jawapan anda.*



[2 marks]
[2 *markah*]

Answer / *Jawapan*:

7

2

8 Sarah works as a salesperson at Supermarket Bahagia. She earns a 2% commission on total sales over RM5 000, which is paid as a bonus at the end of the year.
Sarah bekerja sebagai jurujual di Supermarket Bahagia. Dia menerima komisen 2% jika jualannya melebihi RM5 000, *yang mana dibayar sebagai bonus pada akhir tahun.*
Let her total sales be represented by x. Given that $f(x) = x - 5000$ and $g(x) = 0.02x$.
Biar jumlah jualannya diwakili oleh x. Diberi $f(x) = x - 5000$ *dan* $g(x) = 0.02x$.

(a) Which of the functions fg or gf would calculate her bonus at the end of the year? Explain your reason.

Fungsi fg atau gf yang manakah akan mengira bonus beliau pada akhir tahun ini? Terangkan alasan anda.

(b) Calculate the bonus if Sarah sold RM9 172 at the end of this year.
*Hitungkan bonus jika Sarah telah menjual se*banyak RM9 172 pada akhir tahun.

[4 marks]
[4 *markah*]

Answer / *Jawapan*:

(a)

(b)

8

4

9 Table 9 shows the time taken by 20 employees chosen from Factory A and Factory B to complete a job. The results are recorded as follows
Jadual 9 menunjukkan masa yang diambil oleh 20 orang pekerja yang dipilih dari Kilang A dan Kilang B untuk menyelesaikan suatu tugasan tertentu. Hasilnya dicatatkan seperti berikut.

Times (hours)/ *Masa (jam)*	5	6	7	8	9
Factory A/ *Kilang* A	3	2	9	2	4
Factory B/ *Kilang* B	1	5	7	5	2

Table 9
Jadual 9

Find the mean and the standard deviation of time taken for the workers from Factory A and Factory B respectively. Based on the values obtained, determined which factory's employees are more efficient to complete the job. Justify your answer.
Cari min dan sisihan piawai bagi masa yang diambil oleh pekerja dari Kilang A dan Kilang B masing-masing. Berdasarkan nilai yang diperoleh, tentukan pekerja dari kilang manakah yang lebih cekap menyelesaikan tugasan. Berikan alasan kepada jawapan anda.

[4 marks]
[4 *markah*]

Answer / *Jawapan*:

9

4

10 A set of data consists of 20 positive numbers. It is given that $\sum(x-\bar{x})^2 = m$ and $\sum x^2 = n$. Express in terms of m and n

Suatu set of data mengandungi 20 nombor positif. Diberi $\sum(x-\bar{x})^2 = m$ *dan* $\sum x^2 = n$. *Ungkapkan dalam sebutan m dan n*

(a) variance
varians,

(b) mean.
min.

[2 marks]
[2 *markah*]

Answer / *Jawapan*:
(a)

(b)

10

2

11 Given that x and y are related by a nonlinear equation $3y = h\sqrt{x} + \frac{k}{\sqrt{x}}$, where h dan k are constants. Explain how the values of h and k can be obtained if the x-axis of the straight line graph for the nonlinear equation is represented by $\frac{1}{x}$.

[3 marks]

Diberi x dan y dihubungkan oleh persamaan tak linear $3y = h\sqrt{x} + \frac{k}{\sqrt{x}}$ *dengan keadaan h dan k ialah pemalar. Terangkan bagaimana nilai h dan k dapat diperolehi jika paksi-x bagi graf garis lurus persamaan tak linear tersebut diwakili oleh* $\frac{1}{x}$.

[3 *markah*]

11

3

12 (a) State the value $"P_0$. [1 mark]

Nyatakan nilai $"P_0$. [1 *markah*]

(b) Diagram 12 shows two parallel lines with 4 and 6 points respectively.
Rajah 12 *menunjukkan dua garis selari dengan* 4 *titik dan* 6 *titik masing-masing.*

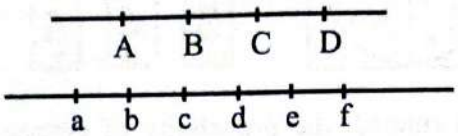


Diagram 12
Rajah 12

Find the number of different ways to form the triangles
Cari bilangan cara yang berbeza untuk membentuk segitiga

(i) by connecting 3 of the 10 points,
dengan menyambung 3 *dari* 10 *titik,*

(ii) if these triangles are connected to point A.
jika segitiga tersebut disambung ke titik A.

[3 marks]
[3 *markah*]

Answer / *Jawapan*:

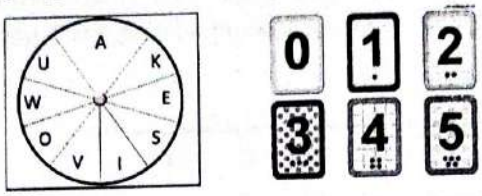
(a)

(b)

12

4

13 The diagram shows a disc labelled with letters and six number cards in a game.
Rajah di bawah menunjukkan sebuah cakera berhuruf dan enam keping kad bernombor yang digunakan dalam suatu permainan.



When the disc is rotated, the probability of getting letter 'A' is $\frac{1}{5}$. The probabilities of getting other than letter 'A' are equal to each other. If the disc is rotated and then a number card is selected at random, find the probability of getting a vowel and an odd digit.

Apabila cakera itu diputar, kebarangkalian mendapat huruf 'A' *ialah* $\frac{1}{5}$. *Kebarangkalian mendapat selain daripada huruf* 'A' *adalah sama antara satu sama lain. Jika cakera diputarkan dan kemudian sekeping kad bernombor dipilih, cari kebarangkalian mendapat huruf vokal dan nombor berganjil.*

[4 marks]
[4 *markah*]

Answer / *Jawapan*:

13

4

14 Show that $3^{x+4} + 3^x - 45(3^{x-2})$ is multiple by $\frac{1}{11}$ for all positive integer.

[3 marks]

Tunjukkan bahawa $3^{x+4} + 3^x - 45(3^{x-2})$ *boleh didarab dengan* $\frac{1}{11}$ *untuk semua integer positif.*

[3 *markah*]

Answer / *Jawapan*:

14

3

15 Given that $\log_2 b = x$ and $\log_{\sqrt{2}} c = y$. Express $\log_8 \frac{256c^2}{b^4}$ in terms of x and y.

[4 *marks*]

Diberi bahawa $\log_2 b = x$ *dan* $\log_{\sqrt{2}} c = y$. *Ungkapkan* $\log_8 \frac{256c^2}{b^4}$ *dalam sebutan x dan y.*

[4 *markah*]

Answer / *Jawapan*:

15

4

16 Diagram 16 shows a sector POQ with centre O and a radius of 10 cm. The point R lies on the line OP.
Rajah 16 *menunjukkan satu sektor POQ yang berpusat O dan berjejari* 10 cm. *Titik R terletak pada garis OP.*

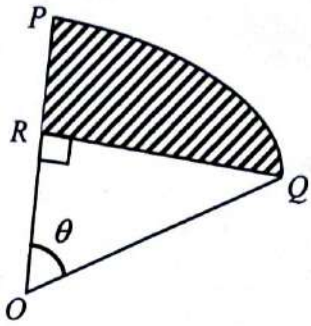


Diagram 16
Rajah 16

Given the length of arc PQ is 8 cm.
Diberi panjang lengkok PQ ialah 8 cm.
[Use / *Guna* $\pi = 3.142$]

Find
Cari

(a) the value of θ, in radian.
nilai θ *dalam radian*

(b) the area of shaded region.
luas rantau berlorek

[4 marks]
[4 *markah*]

Answer / *Jawapan*:

(a)

(b)

16

4

17 It is given that $\cos\alpha = t$, where t is a constant and $270° \le \alpha \le 360°$.
Diberi bahawa $kos\alpha = t$ *dengan keadaan t ialah pemalar dan* $270° \le \alpha \le 360°$.
Express in term of t.
Ungkapkan dalam sebutan t.

(a) $\cos(90° + \alpha)$,
$kos(90° + \alpha)$,

(b) $\tan 2\alpha$.

[4 marks]
[4 *markah*]

Answer / *Jawapan*:
(a)

(b)

17
4

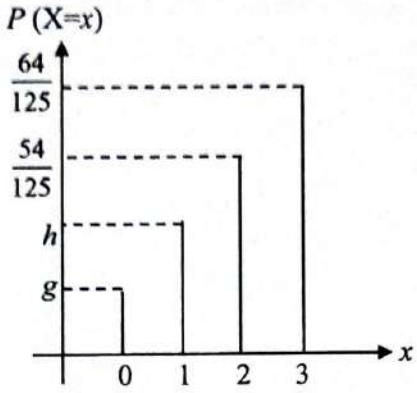
18 A random variable X has a normal distribution with mean 60 and variance σ^2.
Given that $P(X > 61) = 0.3121$, find the value of σ.
Satu pemboleh ubah rawak X *mempunyai taburan normal dengan min* 60 *dan variasi* σ^2.
Diberi $P(X > 61) = 0.3121$, *cari nilai* σ.

[2 marks]
[2 *markah*]

Answer / *Jawapan*:

18
2

19 Muthu has taken 3 shots in a shooting practice. The probability that Muthu strikes the target is p. X represents the number of times Muthu strikes the target. Diagram shows the graph of binomial distribution $X \sim B(3, p)$ of Muthu.
Muthu menembak 3 kali dalam latihan menembaknya. Kebarangkalian Muthu menembak tepat ke arah sasaran ialah p. Rajah menunjukkan graf bagi taburan binomial $X \sim B(3, p)$ *untuk Muthu.*



(a) Express the probability of striking the target more than 1 time in terms of g and h.
Ungkapkan kebarangkalian mengena sasaran lebih daripada 1 kali dalam sebutan g dan h.

(b) Find the probability, p of striking the target.
Cari kebarangkalian, p mengena sasaran.

[4 marks]
[4 *markah*]

Answer / *Jawapan*:

(a)

(b)

19

4

20 Given that points $P(1, 3)$ and $Q(2, 5)$. Point A moves such that his distance from point Q is thrice the distance from point P. Find the equation of the locus of A.
Diberi bahawa titik $P(1, 3)$ dan $Q(2, 5)$. Titik A bergerak dengan keadaan jaraknya dari titik Q adalah tiga kali jaraknya dari titik P. Cari persamaan lokus bagi A.

[3 marks]
[3 *markah*]

Answer / *Jawapan*:

20

3

21 Given $A(2h, 3h)$, $B(2m, n+1)$ and $C(m, n)$ are three points on a straight line. Point C divides line AB internally in the ratio 1: 3. Ekspress m in terms of n.

[3 marks]

Diberi $A(2h, 3h)$, $B(2m, n+1)$ dan $C(m, n)$ adalah tiga titik pada suatu garis lurus. Titik C membahagi garis AB dengan nisbah 1: 3. Ekspress m dalam sebutan n.

[3 *markah*]

Answer / *Jawapan*:

21

3

22 It is given $\overrightarrow{OP} = \begin{pmatrix} r \\ 8 \end{pmatrix}$, $\overrightarrow{OQ} = \begin{pmatrix} 2 \\ 6 \end{pmatrix}$ and $\overrightarrow{OR} = \begin{pmatrix} s \\ -4 \end{pmatrix}$, where r and s are constant. Express r in terms of s, if P, Q and R are collinear .

[2 marks]

Diberi $\overrightarrow{OP} = \begin{pmatrix} r \\ 8 \end{pmatrix}$, $\overrightarrow{OQ} = \begin{pmatrix} 2 \\ 6 \end{pmatrix}$ *and* $\overrightarrow{OR} = \begin{pmatrix} s \\ -4 \end{pmatrix}$, *dengan keadaan r dan s ialah pemalar. Ungkapkan r dalam sebutan s jika P, Q and R adalah segaris.*

[2 markah]

Answer / *Jawapan*:

22

2

23 The straight line $y = rx + 4$ does not intersect the curve $y = x^2 - 4x + 5$. Find the range of values of r.

Garis lurus $y = rx + 4$ *tidak bersilang dengan lengkung* $y = x^2 - 4x + 5$. *Cari julat nilai r.*

[3 marks]

[3 *markah*]

Answer / *Jawapan*:

23

3

24 A remote controlled boat would like to participate in a competition in a river using an engine which allows it to move with velocity vector of $10\underset{\sim}{j}\,ms^{-1}$. The velocity vector for the current of the river and speed of the wind against the boat are $\left(3\underset{\sim}{i}+7\underset{\sim}{j}\right)ms^{-1}$ and $\left(-6\underset{\sim}{i}-4\underset{\sim}{j}\right)ms^{-1}$ respectively.

Sebuah bot kawalan jauh ingin menyertai pertandingan di dalam sungai dengan menggunakan enjin yang membolehkannya bergerak dengan vektor halaju $10\underset{\sim}{j}\,ms^{-1}$. *Vektor halaju bagi arus sungai dan angin bertiup terhadap bot tersebut ialah* $\left(3\underset{\sim}{i}+7\underset{\sim}{j}\right)ms^{-1}$ *dan* $\left(-6\underset{\sim}{i}-4\underset{\sim}{j}\right)ms^{-1}$ *masing-masing.*

Find
Cari

(a) the resultant velocity of boat, [2 marks]
halaju paduan bot itu, [2 *markah*]

(b) the unit vector in the direction of boat. [2 marks]
vektor unit dalam arah bot tersebut. [2 *markah*]

Answer / *Jawapan*:

(a)

(b)

24

4

25 Diagram 25 shows the movement of a ball that was thrown by Ady.
Rajah 25 menunjukkan gerakan sebiji bola selepas dilontar oleh Ady.

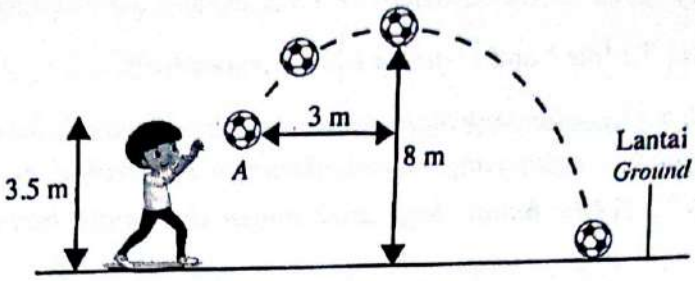


Diagram 25
Rajah 25

The ball is thrown at the height of 3.5 m from the ground. The ball achieved its maximum height of 8 m at a horizontal distance of 3 m from point *A*. Write a quadratic function which represents the movement of the ball.
Bola tersebut dilontar pada ketinggian 3.5 m *dari lantai. Bola tersebut mencapai tinggi maksimum* 8 m *apabila berada pada jarak mengufuk* 3 m *dari titik A. Tulis satu fungsi kuadratik yang mewakili gerakan tersebut.*

[3 marks]
[3 *markah*]

25
3

END OF QUESTION PAPER
KERTAS PEPERIKSAAN TAMAT

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

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

   Kertas soalan ini mengandungi **25** *soalan.*

2. Answer **all** questions.
   Jawab **semua** *soalan.*

3. Write your answers in the spaces provided in the question paper.

   Tulis jawapan anda dalam ruang yang disediakan dalam kertas peperiksaan.

4. Show your working. It may help you to get marks.

   Tunjukkan langkah-langkah penting dalam kerja mengira anda.Ini boleh membantu anda untuk mendapatkan markah.

5. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.

   Sekiranya anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawaoan yang baharu.

6. The diagrams in the questions provided are not drawn to scale unless stated.

   Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.

7. The marks allocated for each question and sub-part of a question are shown in brackets.

   Markah yang diperuntukkan bagi setiap soalan dan ceraian soalan ditunjukkan dalam kurungan.

8. The Upper Tail Probability $Q(z)$ For The Normal Distribution N(0, 1) Table is provided on page **2**.
   Jadual Kebarangkalian Hujung Atas $Q(z)$ Bagi Taburan Normal N(0, 1) *disediakan di halaman* **2.**

9. A list of formulae is provided on pages **3** to **5**.
   Satu senarai rumus disediakan di halaman **3** *hingga* **5**.

10. You may use a scientific calculator.

    Anda dibenarkan menggunakan kalkulator saintifik.

11. Hand in this question paper to the invigilator at the end of the examination.

    Serahkan kertas peperiksaan ini kepada pengawas peperiksaan di akhir peperiksaan.