SOALAN PRAKTIS BESTARI
PROJEK JAWAB UNTUK JAYA (JUJ) 2018

SIJIL PELAJARAN MALAYSIA **3472/2**
ADDITIONAL MATHEMATICS
Kertas 2
SET 2

2½ jam Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa*

2. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*

3. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

Kertas soalan ini mengandungi 21 halaman bercetak.

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

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 $(a^m)^n = a^{nm}$

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

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

$= \int_a^b y \ dx$ or

$= \int_a^b x \ dy$

5 Volume generated

$= \int_a^b \pi y^2 \ dx$ or

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

GEOM ETRY

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

2 Midpoint

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

3 $|r| = \sqrt{x^2 + y^2}$

4 $\hat{r} = \dfrac{xi + yj}{\sqrt{x^2 + y^2}}$

5 A point dividing a segment of a line

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

6. Area of triangle =

$$\frac{1}{2}\left|(x_1y_2 + x_2y_3 + x_3y_{1_1}) - (x_2y_1 + x_3y_2 + x_1y_3)\right|$$

STATISTIC

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

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

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

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

5 $M = L + \left[\frac{\frac{1}{2}N - F}{f_m}\right]C$

6 $I = \frac{P_1}{P_0} \times 100$

7 $\bar{I} = \frac{\sum w_1 I_1}{\sum w_1}$

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

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

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, $\mu = np$

13 $\sigma = \sqrt{npq}$

14 $z = \frac{x-\mu}{\sigma}$

TRIGONOMETRY

1 Arc length, $s = r\theta$

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

3 $\sin^2 A + \cos^2 A = 1$

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

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

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

7 $\cos 2A = \cos^2 A - \sin^2 A$
$= 2\cos^2 A - 1$
$= 1 - 2\sin^2 A$

8 $\tan 2A = \frac{2\tan A}{1 - \tan^2 A}$

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

10 $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$

11 $\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$

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

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

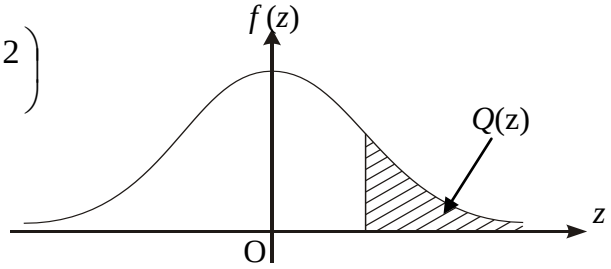
14 Area of triangle $= \frac{1}{2}ab\sin C$

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

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

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



Example / *Contoh*:

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

Section A
Bahagian A

[40 *marks*]
[40 markah]

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

1 Solve the following simultaneous equations:

Selesaikan persamaan serentak berikut:

$$y - 2x + 1 = 0$$

$$6x^2 - y^2 + 6y - 2 = 0$$

Give your answer correct to three decimal places.

Berikan jawapan anda betul kepada tiga tempat perpuluhan.

[5 marks/*markah*]

2 (a) Solve the equation:
Selesaikan persamaan berikut:

$$2^{x+4} - 2^{x+3} = 16.$$

[3 marks*/markah*]

(b) Given $\log_3 x = m$ and $\log_2 x = n$. Find $\log_x 24$ in terms of *m* and *n*.

Diberi $\log_3 x = m$ *dan* $\log_2 x = n$. *Cari nilai bagi* $\log_x 24$ *dalam sebutan m dan n.*

[3 marks*/markah*]

3 Diagram 3 shows part of the curve $y = f(x)$ which passes through point Q.

Line *PQ* parallel to *x*-axis and equation of line *QR* ialah $x = 9$.

Rajah 3 *menunjukkan sebahagian daripada lengkung* $y = f(x)$ *yang melalui* Q.

Garis PQ selari kepada paksi-x dan persamaan garis QR ialah $x = 9$.

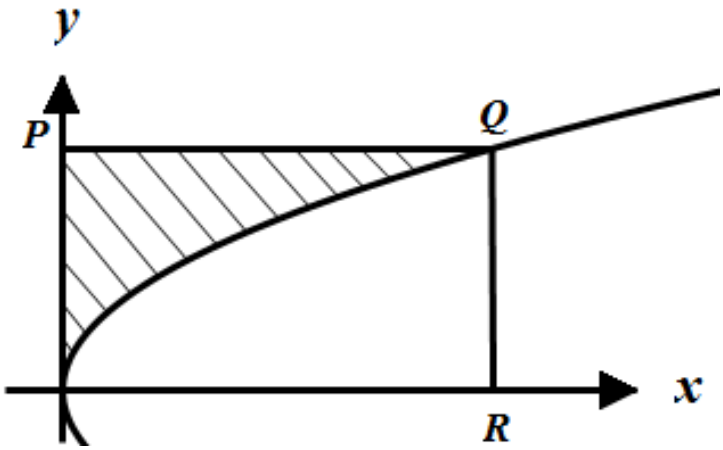


Diagram 3/ *Rajah* 3

The curve has a gradient function of $\frac{1}{\sqrt{x}}$.

Lengkung itu mempunyai fungsi kecerunan $\frac{1}{\sqrt{x}}$.

Find/ *Cari*

(a) the coordinate of *Q*

koordinat bagi Q

[4 marks/*markah*]

(b) the area of the shaded region.

luas rantau berlorek.

[3 marks/*markah*]

4 Solution by scale drawing will not be accepted.
Penyelesaian secara lukisan berskala tidak diterima.

A straight line passes through $P(-3,8)$ and $Q(5,-2)$.
Suatu garis lurus melalui $P(-3,8)$ *dan* $Q(5,-2)$.

a) Given $R(h,13)$ lies on the straight line PQ. Find the value of x.
Diberi $R(h,13)$ *terletak di atas garis lurus* PQ. *Cari nilai* x.

[2 marks*/markah*]

b) Line *PQ* are extended to the point S with ratio *PQ:QS* = 1:2.
Garis PQ dipanjangkan ke titik S dengan nisbah PQ:QS = 1:2.

Find /*Cari*

i) the coordinate of S
koordinat S

ii) the equation of a straight line which is perpendicular to PQ and passes through point S.
persamaan garis lurus yang berserenjang dengan PQ *dan melalui titik* S.

[5 marks*/markah*]

5 Diagram 5 shows a histogram for the distribution of masses for 30 pupils.

Diagram 5 *menunjukkan sebuah histogram bagi taburan jisim untuk* 30 *orang murid.*

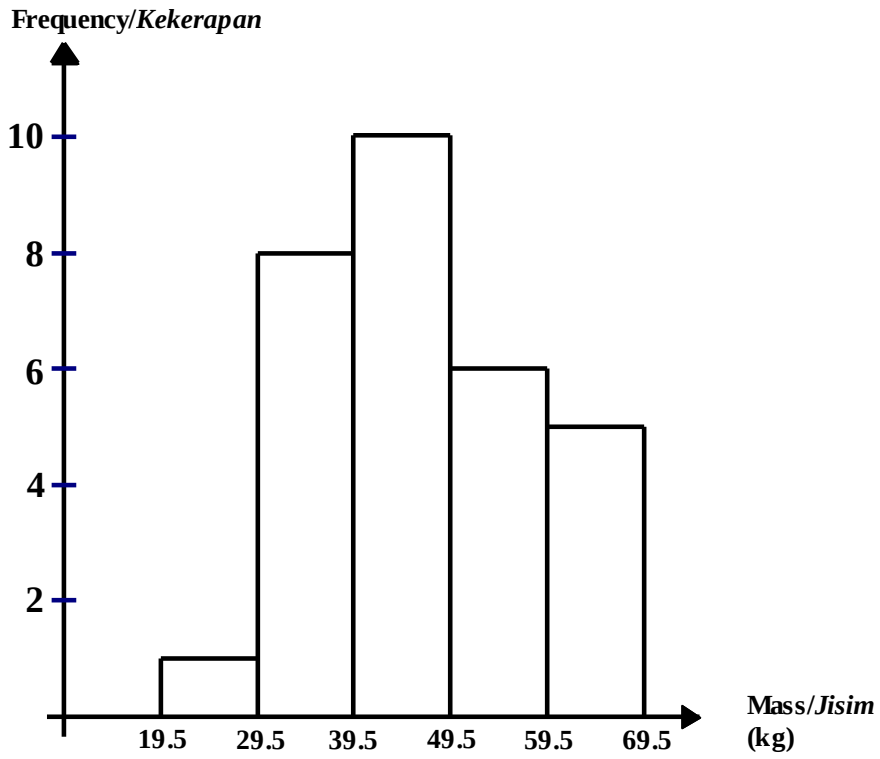


Diagram 5/ *Rajah* 5

(a) Copy and complete the cumulative frequency table below.

Salin dan lengkapkan jadual kekerapan longgokan di bawah.

Mass (kg) *Jisim* (kg)	Frequency *Kekerapan*	Midpoint *Titik tengah*
20 - 29		
30 - 39		
40 - 49		
50 - 59		
60 - 69		

[2 marks/*markah*]

(b) Find / *Cari.*

(i) mean
min

(ii) variance and standard deviation
varians dan sisihan piawai

[6 marks/*markah*]

6 (a) Sketch the graph $y = |1 - 2\sin 2x|$ for $0 \le x \le 2\pi$

Lakarkan graf bagi $y = |1 - 2\sin 2x|$ *untuk* $0 \le x \le 2\pi$

[4 marks/*markah*]

(b) Find the function on the graph that passing through the origin and point $(2\pi, 3)$.

Hence, find the number of solution.

Cari fungsi pada graf yang melalui titik asalan dan titik $(2\pi, 3)$.

Seterusnya, cari bilangan penyelesaiannya.

[3 marks/*markah*]

Section B
***Bahagian* B**

[40 *marks*]
[40 *markah*]

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

7 Diagram 7 shows the movement of Ali and Bakar at a field.

Rajah 7 *menunjukkan pergerakan Ali dan Bakar di sebuah padang.*

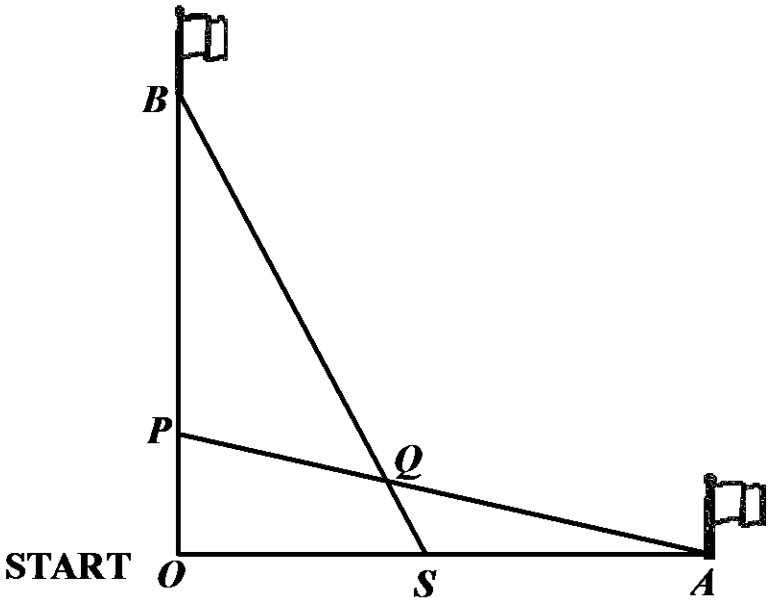


Diagram 7/*Rajah* 7

Ali and Bakar are playing in the field. Ali moves eastward while Bakar moves northward to poke their flags. After poking the flag's pole Ali moves straight to Bakar path and stop at the position of $\frac{1}{3}$ between the starting point and the flag. Meanwhile, Bakar moves straight to Ali's path and stop in the middle of his path. Given the vectors of Ali's and Bakar's path to poke the flag are $8\underset{\sim}{u}$ and $6\underset{\sim}{v}$ respectively. Given that the position of Ali's and Bakar's flags are pointed as *A* and *B*. The last positions of Ali and Bakar are *P* and *S*, while their intersection is *Q*

Ali dan Bakar sedang bermain di padang. Ali bergerak ke arah timur sementara Bakar bergerak ke arah utara untuk memacakkan bendera. Selepas memacakkan bendera, Ali bergerak lurus ke laluan Bakar dan berhenti pada kedudukan $\frac{1}{3}$ *di antara tapak mula dan bendera. Sementara Bakar pula bergerak lurus ke laluan Ali dan berhenti ditengah-tengah laluannya. Diberi vektor laluan Ali dan Bakar untuk memacak bendera masing-masing ialah* $8\underset{\sim}{u}$ *dan* $6\underset{\sim}{v}$ *. Diberi bahawa kedudukan bendera Ali dan bendera Bakar sebagai A dan B. Kedudukan terakhir Ali dan Bakar pula ialah P dan S, manakala tempat persilangan mereka ialah Q*

(a) Express, in terms of $\underset{\sim}{u}$ and $\underset{\sim}{v}$:

Ungkapkan, dalam sebutan $\underset{\sim}{u}$ *dan* $\underset{\sim}{v}$:

(i) the vector between Ali's to Bakar's flag.
vektor di antara bendera Ali dan bendera Bakar.

(ii) the vector of Ali's path after poking the flag.
vektor laluan Ali selepas memacakkan bendera.

[3 marks/*markah*]

(b) Given that $\overrightarrow{AQ} = k\overrightarrow{AP}$ and $\overrightarrow{AQ} = \overrightarrow{AB} + m\overrightarrow{BS}$ where k and m are constants.
Find the values of k and m.

Diberi bahawa $\overrightarrow{AQ} = k\overrightarrow{AP}$ *dan* $\overrightarrow{AQ} = \overrightarrow{AB} + m\overrightarrow{BS}$ *dengan keadaan* k dan m *adalah pemalar.*
Cari nilai k dan m.

[5 marks/*markah*]

(c) Given that $\left|\underset{\sim}{u}\right| = 1$ unit and $\left|\underset{\sim}{v}\right| = 3$ unit , find the area of triangle enclosed by starting point, point *A* and point *B*, in units^2.

Diberi bahawa $\left|\underset{\sim}{u}\right| = 1$ unit *dan* $\left|\underset{\sim}{v}\right| = 3$ unit, *cari luas segitiga yang dibatasi oleh titik mula , titik A dan titik B, dalam unit*^{2}

[2 marks/*markah*]

[Lihat sebelah

8

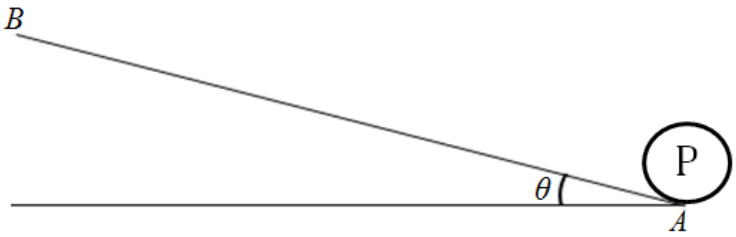


Diagram 8/ *Rajah* 8

Diagram 8 shows that *AB* is a smooth plane that slopes with θ to the horizon. A particle *P* is rolled up, along the plane from point *A* with initial velocity of $v_0\,\text{ms}^{-1}$ and its distance from point *A* is *s* meter after *t* seconds. The values for *t* and *s* are shown in table 8 below.

Rajah 8 *menunjukkan AB ialah satah licin yang condong dengan sudut θ kepada ufuk. Satu zarah P dilancarkan ke atas disepanjang satah, dari titik A dengan halaju awal* $v_0\ ms^{-1}$ *dan jaraknya dari titik A ialah s meter selepas masa t saat . Nilai- nilai bagi t dan s ditunjukkan dalam jadual* 8 *berikut.*

t(second) *t* (*saat*)	1	2	3	4	5	6
s (meter)	35.75	64	90	108	125	126

Table 8/ *Jadual* 8

The relation of the distance traveled, *s* meter with time, *t* second is $s = v_0 t - 5t^2 \sin\theta$.

Diketahui bahawa hubungan antara jarak yang dilalui, s meter dengan masa, t saat ialah $s = v_0 t - 5t^2 \sin\theta$.

(a) Plot $\frac{s}{t}$ against *t*, using a scale of 2 cm to 1 unit on the *x*-axis and 2 cm to 5 units on the *y*-axis. Hence, draw the line of the best fit.

Plot $\frac{s}{t}$ *melawan t, menggunakan skala* 2 *cm kepada* 2 *unit pada paksi-x dan* 2 cm *kepada* 5 *unit kepada paksi-y . Seterusnya, lukis garis lurus penyuaian terbaik.*

[4 marks/*markah*]

(b) Using the graf in 8 (*a*) , find the value of
Menggunakan graf di 8 (*a*) , *cari nilai*

(i) θ ,

(ii) v_0 ,

(iii) the distance of particle after 1.5 seconds from point *A.*
jarak zarah selepas 1.5 *saat daripada titik A* .

[6 marks/*markah*]

9 (a) The probability of a voter walking to the polling station is *p*. A sample of 6 voters was randomly selected.
Kebarangkalian seorang pengundi datang berjalan kaki ke pusat mengundi ialah p. Suatu sampel 6 orang pengundi dipilih secara rawak.

(i) If the probability of 6 voters walking to the polling center is 0.11765, find the value of *p*
Jika kebarangkalian bagi 6 *orang pengundi berjalan kaki ke pusat mengundi ialah* 0.11765, *cari nilai p.*

(ii) Find the probability that at most than 2 people are **not** walking
Cari kebarangkalian bahawa selebih-lebihnya 2 *orang* ***tidak*** *berjalan kaki*

[5 marks/*markah*]

(b) Diagram 9 shows a standard normal distribution graph representing the age group who came to vote in the general election in a district.

Rajah 9 *menunjukkan satu graf taburan normal piawai yang mewakili kelompok umur yang datang mengundi dalam pilihan raya umum di sebuah daerah.*

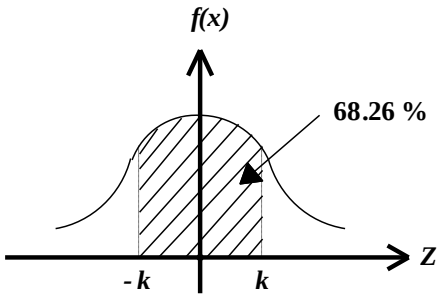


Diagram 9/ *Rajah* 9

It was found that the age of voters who came to the voting center was normally distributed with a mean of 38.5 years and a standard deviation of 5.5 years. If the percentage of the age group in the shaded region is 68.26%.

Didapati umur pengundi yang datang ke pusat mengundi tersebut bertabur secara normal dengan min 38.5 *tahun dan sisihan piawai* 5.5 *tahun. Jika peratus kelompok umur dalam kawasan berlorek ialah* 68.26 %.

Find

Cari

(i) The age range of voters in the shaded region

Julat umur pengundi dalam kawasan berlorek

(ii) The probability that age groups who come to a vote exceed 55 years.

Kebarangkalian bahawa kelompok umur yang datang mengundi melebihi 55 *tahun.*

[5 marks/*markah*]

10 Diagram 10 shows a round bottom flask of radius 12 cm. Water is poured into the flask such that the height of the water level from its base, *h* cm, increases at the rate of 0.2 cms^{-1}.

Rajah 10 *menunjukkan kelalang dasar bulat dengan jejari* 12 cm. *Air di dimasukkan ke dalam kelalang tersebut dengan keadaan tinggi paras air dari dasar kelalang, h cm, meningkat dengan kadar* 0.2 cm^{-1}.

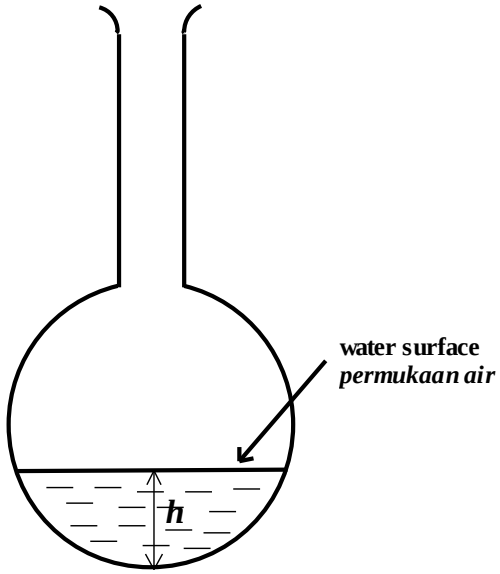


Diagram 9/ *Rajah* 9

(a) Show that the area of the surface, A cm^2, it given by $A = \pi\left(24h - h^2\right)$.

Tunjukkan luas permukaan air, A cm^2, *diberi sebagai* $A = \pi\left(24h - h^2\right)$.

[4 marks/*markah]*

(b) Find /*cari*

(i) the approximate increases in the area of the surface water if the height increases from 4 cm to 4.05 cm.

cari tokokan hampir bagi luas permukaan air, jika ketinggian air menokok daripada 4 cm *kepada* 4.05 cm.

(ii) the rate of increases of the area of the water surface at $h = 2$.

kadar tokokan luas permukaan air ketika $h = 2$

[6 marks/*markah*]

[Lihat sebelah

11 Diagram 11 shows part of the front view of the two gears on a car engine.
Rajah 11 *menunjukkan pandangan depan bagi dua gegancu pada enjin kereta.*

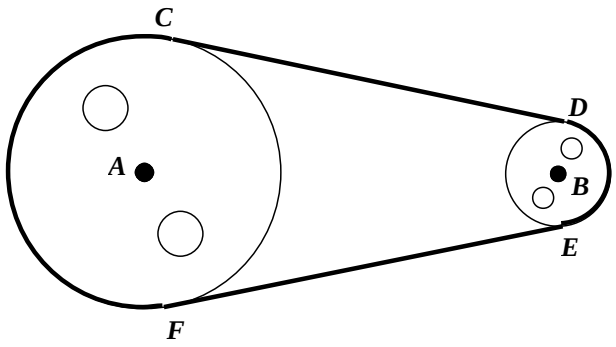


Diagram 11/ *Rajah* 11

The larger circle has centre A and its radius is 8 cm. The smaller circle has centre B and its radius is 5 cm. Given that the distance between the two circles is 21 cm. Straight line CD and FE are the common tangents to the circles at point C, D, E and F.
Bulatan yang lebih besar mempunyai pusat A *dan jejarinya ialah* 8cm. *Bulatan yang lebih kecil mempunyai pusat* B *dan jejarinya ialah* 5cm. *Diberi jarak antara kedua-dua bulatan itu ialah* 21cm. *Garis lurus* CD *dan* FE *ialah tangen sepunya kepada kedua-dua bulatan itu di titik* C, D, E *dan* F.
[Use/Guna $\pi = 3.142$].

Find,/ *Cari*

(a) the angle, in radiant, of the minor sector CAF
sudut, dalam radian, bagi sektor minor CAF

[3 marks/*markah*]

(b) the length, in cm of the conveyor belt used on both gear
panjang tali sawat digunakan pada kedua-dua gear ini

[4 marks/*markah*]

(c) the area in cm^2, between both gear.
luas dalam cm^2, *di antara kedua-dua gegancu.* [3 marks/*markah*]

Section C
Bahagian C

[20 *marks*]
[20 *markah*]

Answer any **two** questions *from this section.*
Jawab mana-mana **dua** *soalan daripada bahagian ini.*

12 Diagram 12 shows a rectangular edge in a circle.

Rajah 12 *menunjukkan segi empat terterap di dalam sebuah bulatan.*

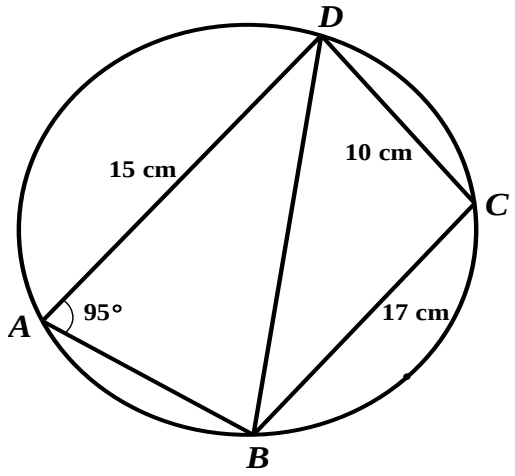


Diagram 12
***Rajah* 12**

(a) Find,/*cari,*

(i) the area, in cm^2, of ΔBCD,

luas, dalam cm^2, ΔBCD,

(ii) the length, in cm, of *BD*,

panjang, dalam cm, *BD,*

(iii) the nearest distance, in cm, from point *C* to *BD.*

jarak terdekat, dalam cm, *dari titik C ke BD.*

[6 marks/*markah*]

(b) Calculate $\angle ADC$.

Hitungkan $\angle ADC$.

[4 marks/*markah*]

13 An entrepreneur of biscuit products produces two types of biscuits, mazola and pineapple's tart. The entrepreneur can produce not more than 100 mazola biscuits and pineapple's tart in a day. The ratio of the number of boxes of mazola biscuits to the number of boxes of pineapple's tart made in a day at least 1: 3. Every day, at least 30 boxes of pineapple's tart can be produced. Given that x represents the number of mazola biscuits' boxes and y represents the number of pineapple's tart boxes.

Seorang pengusaha produk biskut menghasilkan dua jenis biskut iaitu biskut mazola dan tat nenas. Pengusaha tersebut dapat menghasilkan tidak melebihi 100 buah kotak biskut mazola dan tat nenas dalam sehari. Nisbah bilangan kotak biskut mazola kepada bilangan kotak tat nenas yang dihasilkan dalam sehari sekurang-kurangnya 1 : 3. Setiap hari, sekurang-kurangnya 30 buah kotak tat nenas dapat dihasilkan. Diberi bahawa x mewakili bilangan kotak biskut mazola dan y mewakili bilangan kotak tat nenas dalam sehari.

(a) State three inequalities other than $x \geq 0$ and $y \geq 0$, satisfying the above conditions.

Nyatakan tiga ketaksamaan selain daripada $x \geq 0$ dan $y \geq 0$, yang memuaskan syarat-syarat di atas.

[3 marks/*markah*]

(b) Using a scale of 2 cm to 10 units on each axis, draw and shade the region R which satisfies all of the above conditions.

Dengan menggunakan skala 2 cm *kepada* 10 unit *pada setiap paksi, lukis dan lorek rantau R yang memuaskan semua syarat di atas.*

[3 marks/*markah*]

(c) The profit for a box of mazola biscuit and a box of pineapple's tart are RM 5 and RM 8 respectively. Find the range of profit and earned from the products of mazola biscuits and pineapple's tart.

Keuntungan bagi setiap kotak biskut mazola dan tat nenas adalah RM 5 *dan* RM 8 *masing-masing. Cari julat keuntungan yang diperolehi daripada produk biskut mazola dan tat nena tersebut.*

[4 marks/*markah*]

14 Diagram 14 shows three fixed points *O, P* and *Q* on a straight line.

Rajah 14 *menunjukkan tiga titik tetap O, P dan Q pada suatu garis lurus.*

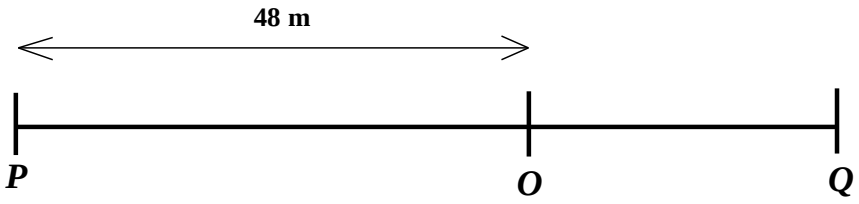


Diagram 14/ *Rajah* 14

A particle moves along a straight line and passes through a fixed point O. Its velocity v ms^{-1}, is given by $v = 8 - 2t$, where t is the time after leaving the point O. The particle stop instantaneously at point Q.

Suatu zarah bergerak di sepanjang garis lurus dan melalui satu titik tetap O. Halajunya v ms^{-1}, diberi oleh $v = 8 - 2t$, dengan keadaan t ialah masa selepas meninggalkan titik tetap O. Zarah itu berhenti seketika pada titik Q.

[Assume that motion to the right is positive]

[*Anggapkan gerakan ke arah kanan sebagai positif*]

Find/ *Cari*

(a) the accelaration in ms^{-2} of the particle,

pecutan, dalam ms^{-2}, zarah itu,

[1 mark/*markah*]

(b) the time, in second, when the particle is at Q,

masa, dalam saat , apabila zarah itu berada di Q,

[2 marks/*markah*]

(c) the velocity, in ms$^{-1,}$ of the particles when it passes through P,

halaju, dalam ms^{-1}, *bagi zarah itu apabila melalui P,*

[4 marks/*markah*]

(d) the total distance, in m, travelled by the particles from O to P passing through *Q*.

jumlah jarak, dalam m, yang dilalui oleh zarah itu dari O ke P melalui Q.

[3 marks/*marks*]

15 Table 15 shows the price of four main ingredients *P, Q, R* and *S*, used in the making of a packet of muffin.

Jadual 15 *menunjukkan empat jenis bahan utama P, Q, R dan S, yang digunakan untuk membuat sebungkus mufin.*

Ingredient *Bahan*	Price (RM) per kg *Harga* (RM) *per* kg	
	Year 2014 *Tahun* 2014	Year 2017 *Tahun* 2017
P	2.50	2.85
Q	3.20	4
R	*a*	*b*
S	*c*	5.50

Table 15/ *Jadual* 15

(a) Price index for ingredient *S* for the year 2017 based on the year 2014 is 110. Find the value of *c*.

Nombor indeks bagi S pada tahun 2017 *berasaskan tahun* 2014 *ialah* 110. *Cari nilai c.*

[2 marks/*markah*]

(b) Price index for ingredient *R* for the year 2017 based on the year 2014 is 140. Price of 1 kilogram ingredient *R* in the year 2014 is RM 2 less than its price in the year 2017. Find values of *a* and of *b*.

Nombor indeks bahan R pada tahun 2017 *berasaskan tahun* 2014 *ialah* 140. *Harga sekilogram bahan R pada tahun* 2014 *ialah* RM 2 *kurang daripada harganya pada tahun* 2017. *Cari nilai a dan b.*

[3 marks/*markah*]

(c) The composite index for the cost of making a packet of muffin in the year 2017 based on the year 2014 is 121. Calculate,
Indeks gubahan bagi kos membuat sebungkus muffin pada tahun 2017 *berasaskan tahun* 2014 *ialah* 121. *Hitungkan,*

(i) the price of a packet of muffin in the year 2014 if its corresponding price in the year 2017 is RM 4.55
Harga sebungkus muffin pada 2014 *jika harganya yang sepadan pada tahun* 2017 *ialah* RM 4.55.

(ii) the value of *m* if the quantity of ingredient *P, Q, R* and *S* used are in the ratio of $2:5:2:m$.
nilai m jika kuantiti P, Q, R dan S yang digunakan adalah mengikut nisbah $2:5:2:m$.

[5 marks/*markah*]

END OF QUESTION PAPER

KERTAS SOALAN TAMAT