



**MAJLIS PENGETUA SEKOLAH MALAYSIA  
NEGERI KEDAH DARUL AMAN**

**PROGRAM PEMANTAPAN PRESTASI TINGKATAN 5  
TAHUN 2017**

**MATEMATIK TAMBAHAN  
KERTAS 2  
MODUL 1**

$2\frac{1}{2}$  jam

Dua jam tiga puluh minit

---

**JANGAN BUKA MODUL INI SEHINGGA DIBERITAHU**

1. *This module consists of three sections : **Section A, Section B and Section C.***
2. *Answer **all** questions in **Section A**, **four** questions from **Section B** and **two** questions from **Section C.***
3. *Give only **one** answer/solution to each question.*
4. *Show your working. It may help you to get your marks.*
5. *The diagrams provided are not drawn according to scale unless stated.*
6. *The marks allocated for each question and sub - part of a question are shown in brackets.*
7. *The Upper Tail Probability  $Q(z)$  For The Normal Distribution  $N(0,1)$  Table is provided on Page **18.***
8. *You may use a **non-programmable** scientific calculator.*
9. *A list of formulae is provided in page 2 and 3.*

---

Modul ini mengandungi 18 halaman bercetak.

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

**ALGEBRA**

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

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

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

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

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

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

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

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

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

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

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

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

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

**CALCULUS**

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

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

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

$$4. \text{Area under a curve}$$

$$= \int_a^b y dx \quad \text{or}$$

$$= \int_a^b x dy$$

$$5. \text{Volume of revolution}$$

$$= \int_a^b \pi y^2 dx \quad \text{or}$$

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

**GEOMETRY**

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

$$2. \text{Mid point}$$

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

$$3. \text{Division of line segment by a point}$$

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

$$4. \text{Area of triangle}$$

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

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

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

## STATISTICS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**Section A**  
**Bahagian A**  
[ 40 marks ]  
[ 40 markah ]

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

1

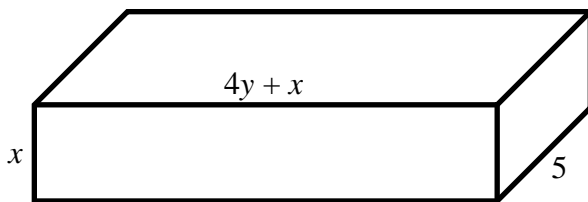


Diagram 1(a) / Rajah 1(a)

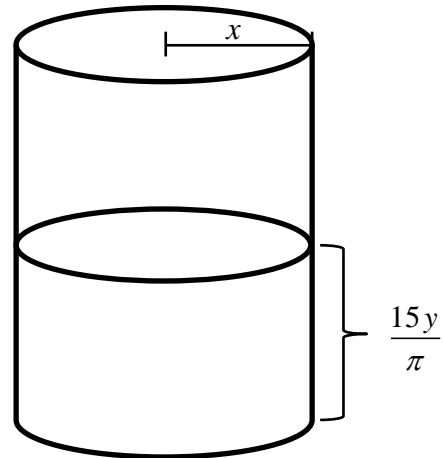


Diagram 1(b) / Rajah 1(b)

Company XYZ wants to produce a kind of chocolate bar with a mold in cuboid shape as shown in Diagram 1(a). Ingredient of the chocolate was provided in a cylindrical container as shown in Diagram 1(b). The height of the ingredient is  $\frac{15y}{\pi}$ .

Given the perimeter of the mold is 52 cm. Find the base area for the mold.

[Given  $x$  and  $y$  are positive integer.]

[8 marks]

*Sebuah syarikat XYZ ingin menghasilkan suatu jenis coklat bar dengan menggunakan acuan berbentuk kuboid seperti dalam Rajah 1(a). Ramuan coklat telah disediakan dalam bekas berbentuk silinder seperti dalam Rajah 1(b). Ketinggian ramuan tersebut ialah  $\frac{15y}{\pi}$ .*

*Diberi perimeter bagi acuan coklat bar ialah 52 cm. Carikan luas tapak bagi acuan coklat bar.*

*[Diberi  $x$  dan  $y$  adalah integer positif.]*

[8 markah]

- 2 The mass of a group of 10 workers in a company that would like to donate blood in the campaign that was held has a mean 56 kg and standard deviation 6 kg.

(a) Find

i) the sum of the mass of workers,

ii) the sum of the squares of the mass of workers. [4 marks]

- (b) If two new employees who have a mean mass of 46 kg would like to donate blood. Find the new mean and standard deviation. [3 marks]

*Jisim sekumpulan 10 orang pekerja dalam sebuah syarikat yang ingin menderma darah dalam kempen yang diadakan mempunyai min 56 kg dan sisihan piawai 6 kg.*

(a) Cari

i) hasil tambah jisim pekerja-pekerja tersebut,

ii) hasil tambah kuasa dua bagi jisim pekerja-pekerja tersebut. [4 markah]

- (b) Jika dua orang pekerja baru yang mempunyai min jisim 46 kg ingin menderma darah. Cari min baru dan sisihan piawai baru. [3 markah]

- 3 Pak Ali working on a pond. He has 2176 fish in the pond and adds 120 fish into the pond on the first day of each month starting in March 2016.

(a) What is the number of fish in the pond on 10 May 2017? [3 marks]

- (b) On 15 June 2017, the fish in the pond have been infected by a disease. It is known that half of the fish in the pond will die every day starting from next day and the following days. State the date when all the fish in the pond die. [3 marks]

*Pak Ali mengusahakan satu kolam ikan. Beliau menternak 2176 ekor ikan dalam kolam dan menambahkan 120 ekor ikan ke dalam kolam pada hari pertama setiap bulan mulai Mac 2016.*

(a) Berapakah jumlah ikan dalam kolam pada 10 Mei 2017? [3 markah]

- (b) Pada 15 Jun 2017, ikan di dalam kolam telah dijangkiti sejenis penyakit. Diketahui bahawa separuh daripada jumlah ikan akan mati setiap hari mulai keesokan hari dan hari-hari seterusnya. Nyatakan tarikh apabila semua ikan di dalam kolam tersebut mati. [3 markah]

4

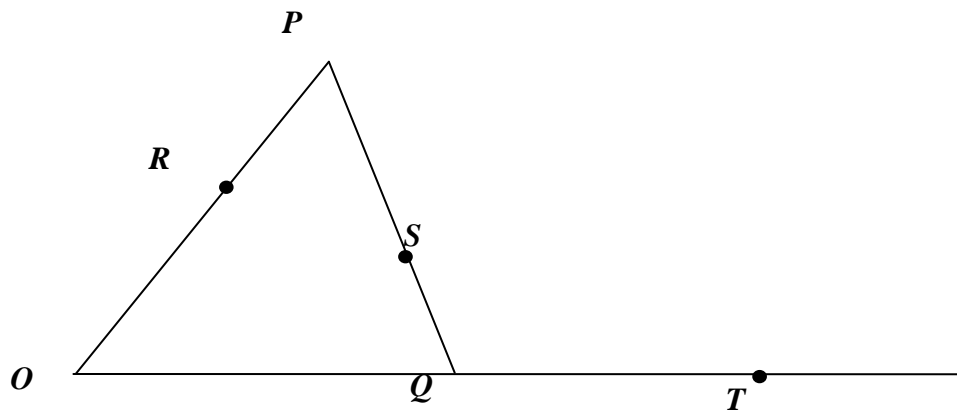


Diagram 4 / Rajah 4

In Diagram 4,  $OPQ$  is a triangle with  $\overrightarrow{OP} = 5\mathbf{p}$  and  $\overrightarrow{OQ} = \mathbf{q}$ .  $R$  and  $S$  are lies on the line  $OP$  and  $PQ$  respectively with condition  $OR = \frac{3}{5}OP$  dan  $PS = \frac{2}{3}PQ$ .

The straight line  $OQ$  is extended to a point  $T$  such that  $OT = \mu OQ$ .

- (a) Express  $\overrightarrow{RS}$  and  $\overrightarrow{ST}$  in terms of  $\mathbf{p}$  and  $\mathbf{q}$  [3 marks]
- (b) Given that points  $R$ ,  $S$  and  $T$  are collinear and  $\overrightarrow{RS} = \lambda \overrightarrow{ST}$ , find the values of  $\mu$  and  $\lambda$ . [5 marks]

Dalam Rajah 4 di atas,  $OPQ$  ialah sebuah segitiga dengan  $\overrightarrow{OP} = 5\mathbf{p}$  dan  $\overrightarrow{OQ} = \mathbf{q}$ .  $R$  dan  $S$  masing-masing ialah titik yang berada pada garis  $OP$  dan  $PQ$  dengan keadaan  $OR = \frac{3}{5}OP$  dan

$PS = \frac{2}{3}PQ$ . Garis lurus  $OQ$  dipanjangkan ke suatu titik  $T$  dengan keadaan  $OT = \mu OQ$ .

- (a) Ungkapkan  $\overrightarrow{RS}$  dan  $\overrightarrow{ST}$  dalam sebutan  $\mathbf{p}$  dan  $\mathbf{q}$ . [3 markah]
- (b) Diberi bahawa titik  $R$ ,  $S$  dan  $T$  adalah segaris dan  $\overrightarrow{RS} = \lambda \overrightarrow{ST}$ , cari nilai  $\mu$  dan  $\lambda$ . [5 markah]

5 (a) Show that  $5^{n+2} + 10(5^{n-1}) - 17(5^n)$  is divisible by 2. [2 marks]

(b) Solve  $\log_3 q \times \log_p 81 \times \log_q p^{3q} = 9$ . [3 marks]

(a) Tunjukkan  $5^{n+2} + 10(5^{n-1}) - 17(5^n)$  boleh dibahagi tepat dengan 2. [2 markah]

(b) Selesaikan  $\log_3 q \times \log_p 81 \times \log_q p^{3q} = 9$ . [3 markah]

6 Tronic Company produced an electronic device. The probability that the device does not function properly is 0.15. Mr Elec, quality control supervisor, knows that the lengths of the electronic devices are normal distributed with a mean of 8 cm and a standard deviation of 0.1 cm.

(a) Tony bought 10 devices from Tronic Company. Find the probability that more than 8 devices are function properly.

[3 marks]

(b) Mr Elec choose a device at random, what is the probability that the length of the device is between 7.96 cm and 8.03 cm ?

[3 marks]

*Syarikat Tronic menghasilkann sejenis peralatan elektronik. Kebarangkalian peralatan tersebut tidak berfungsi dengan baik ialah 0.15. En. Elec, penyelia kawalan kualiti, mengetahui bahawa panjang peralatan elektronik adalah bertaburan normal dengan min 8 cm dan sisihan piawai 0.1 cm.*

(a) Tony membeli 10 alat daripada Syarikat Tronic. Cari kebarangkalian lebih daripada 8 alat berfungsi dengan baik.

[3 markah]

(b) En Elec pilih satu alat secara rawak, apakah kebarangkalian panjang alat tersebut di antara 7.96 cm dan 8.03 cm ?

[3 markah]

**Section B****Bahagian B**

[ 40 marks ]

[ 40 markah ]

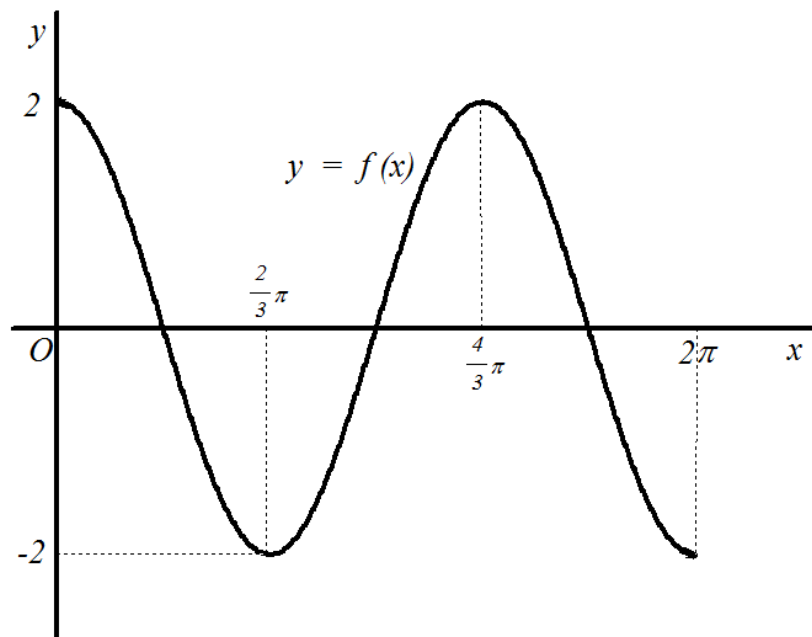
Answer **four** questions from this section.*Jawab empat* soalan daripada bahagian ini.

- 7 (a) Prove that  $\sin x \cot^2 x + \sin x = \operatorname{cosec} x$  [2 marks]

*Buktikan*  $\sin x \cot^2 x + \sin x = \operatorname{kosec} x$  [2 markah]

- (b) Diagram 7 shows a graph of trigonometric function,  $y = f(x)$  for  $0 \leq x \leq 2\pi$ .

*Rajah 7* menunjukkan sebuah graf bagi fungsi trigonometri,  $y = f(x)$  untuk  $0 \leq x \leq 2\pi$ .

Diagram 7 / *Rajah 7*

- (i) Write the equation of the graph of trigonometric function  $y = f(x)$ . [3 marks]
- (ii) Sketch the graph of  $y = 1 - f(x)$  for  $0 \leq x \leq 2\pi$ . [2 marks]
- (iii) Hence, using the graph in (b)(ii), sketch a suitable straight line to find the number of solutions to the equation  $\frac{5}{2} - f(x) - \frac{x}{\pi} = 0$  for  $0 \leq x \leq 2\pi$ . [3 marks]
- State the number of solutions.



- (i) *Tuliskan persamaan bagi graf fungsi trigonometri  $y = f(x)$ .* [3 markah]
- (ii) *Lakar graf  $y = 1 - f(x)$  untuk  $0 \leq x \leq 2\pi$ .* [2 markah]
- (iii) *Seterusnya, dengan menggunakan graf di (b)(ii), lakar satu garis lurus yang sesuai untuk mencari bilangan penyelesaian bagi persamaan  $\frac{5}{2} - f(x) - \frac{x}{\pi} = 0$  untuk  $0 \leq x \leq 2\pi$ .*  
*Nyatakan bilangan penyelesaian itu.* [3 markah]

8

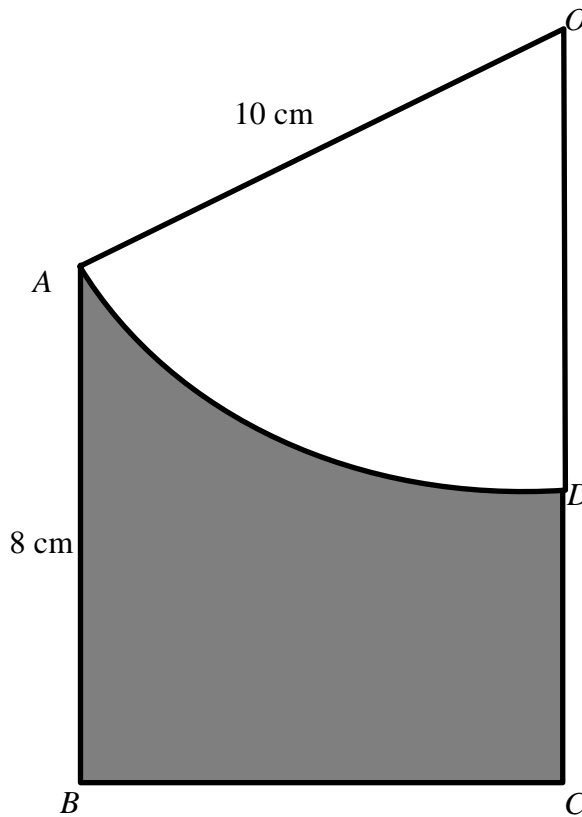


Diagram 8/ Rajah 8

Diagram 8 shows a sector  $OAD$  with centre  $O$ . It is given that  $OA = 10$  cm,  $AB = 8$  cm,  $BC = 5$  cm and the ratio  $OD : OC = 5 : 6$ .

Find

- (a)  $\angle AOD$  in radian, [2 marks]
- (b) the perimeter, in cm of the shaded region, [4 marks]
- (c) the area, in  $\text{cm}^2$  of the shaded region. [4 marks]

Rajah 8 menunjukkan sektor  $OAD$  dengan pusat  $O$ . Diberi  $OA = 10$  cm,  $AB = 8$  cm,  $BC = 5$  cm dan nisbah  $OD : OC = 5 : 6$

Cari

- (a)  $\angle AOD$  dalam radian, [2 markah]
- (b) perimeter, dalam cm kawasan berlorek, [4 markah]
- (c) luas dalam,  $\text{cm}^2$  kawasan berlorek. [4 markah]

9

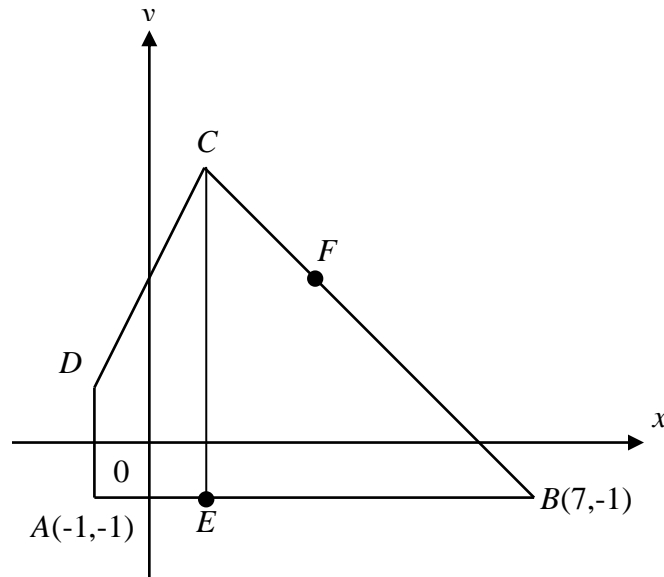


Diagram 9 / Rajah 9

Diagram 9 shows a quadrilateral  $ABCD$ . Given that  $AB = 4AE$ ,  $CF = \frac{1}{3}CB$ ,  $AD = AE$  and  $EC = EB$ .  $AD$  and  $CE$  are parallel to  $y$ -axis. A point  $P$  moves through point  $D$  and point  $E$  with centre at point  $A$ .

Find

- the coordinates of  $F$ , [3 marks]
- the equation of the straight line which is perpendicular to  $BC$  and passing through point  $D$ , [3 marks]
- the area of quadrilateral  $ABCD$ , [2 marks]
- the locus  $P$ . [2 marks]

Rajah 9 menunjukkan sebuah sisiempat  $ABCD$ . Diberi  $AB = 4AE$ ,  $CF = \frac{1}{3}CB$ ,  $AD = AE$  dan  $EC = EB$ .  $AD$  dan  $CE$  adalah selari dengan paksi- $y$ . Satu titik  $P$  bergerak melalui titik  $D$  dan titik  $E$  dengan berpusatkan titik  $A$ .

Cari

- koordinat  $F$ , [3 markah]
- persamaan garis lurus yang berserenjang dengan  $BC$  dan melalui titik  $D$ , [3 markah]
- luas sisiempat  $ABCD$ , [2 markah]
- lokus bagi titik  $P$ . [2 markah]

- 10 Diagram 10 shows the graphs of a straight line and a curve.  
Rajah 10 menunjukkan graf bagi garis lurus dan lengkung.

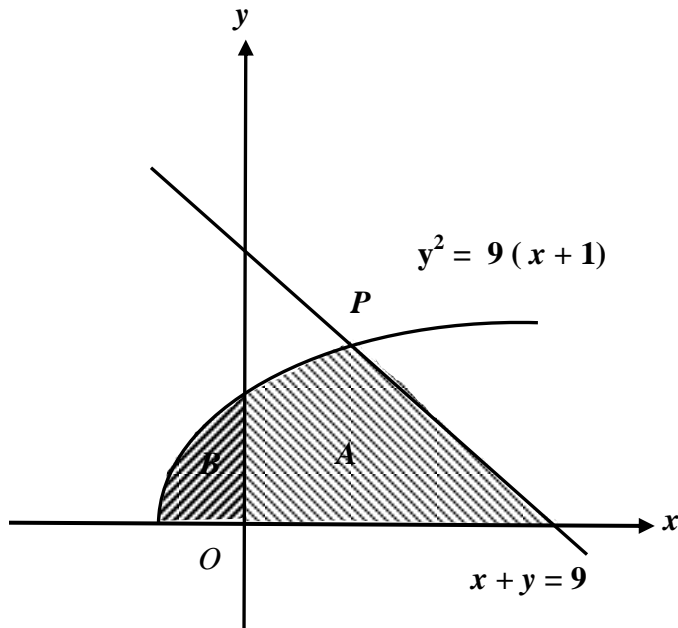


Diagram 10 / Rajah 10

Find

- (a) the coordinates of  $P$ , [ 3 marks ]  
 (b) the area of shaded region  $A$ , [ 4 marks ]  
 (c) the volume of revolution when the region  $B$  is rotated through  $360^\circ$  about the  $y$ -axis. [ 3 marks ]

Cari

- (a) koordinat  $P$ , [ 3 markah ]  
 (b) luas bagi kawasan berlorek  $A$ , [ 4 markah ]  
 (c) isipadu kisaran apabila rantau  $B$  diputarakan melalui  $360^\circ$  pada paksi- $y$ . [ 3 markah ]

11 Use the graph paper provided to answer this question.

Gunakan kertas graf yang disediakan untuk menjawab soalan ini.

$x$	3	4	5	6	7	10
$y$	1.02	0.542	0.428	0.392	0.345	0.303

Table 11 / Jadual 11

Table 11 shows the value of two variables  $x$  and  $y$  obtained from an experiment. The variables  $x$  and

$y$  are related by the equation  $y = \frac{x}{px + qp}$ , where  $p$  and  $q$  are constants.

(a) Based on Table 11, construct a table for the values of  $\frac{1}{y}$  and  $\frac{1}{x}$ . [2 marks]

(b) Plot  $\frac{1}{y}$  against  $\frac{1}{x}$ , using a scale of 2cm to 0.05 unit on the  $\frac{1}{x}$ -axis and 2cm to 0.5 unit

on the  $\frac{1}{y}$ -axis. Hence draw the line of best fit. [3 marks]

(c) Use the graph in 11(b) to find the value of

(i)  $p$

(ii)  $q$

(iii)  $y$  when  $x = 8$

[5 marks]

Jadual 11 menunjukkan nilai-nilai dua pembolehubah  $x$  dan  $y$  yang diperolehi daripada satu

eksperimen. Pembolehubah  $x$  dan  $y$  dihubungkan oleh persamaan  $y = \frac{x}{px + qp}$  dengan keadaan  $p$

dan  $q$  adalah pemalar.

(a) Berdasarkan Jadual 11, bina satu jadual bagi nilai-nilai  $\frac{1}{y}$  dan  $\frac{1}{x}$ . [2 markah]

(b) Plot  $\frac{1}{y}$  melawan  $\frac{1}{x}$ , dengan menggunakan skala 2cm kepada 0.05 unit pada paksi  $\frac{1}{x}$

dan 2cm kepada 0.5 unit pada paksi  $\frac{1}{y}$ . Seterusnya lukis garis lurus penyuaian terbaik.

[3 markah]

(c) Gunakan graf di 11(b) untuk mencari nilai

(i)  $p$

(ii)  $q$

(iii)  $y$  apabila  $x = 8$

[5 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** A particle moves along a straight line such that its velocity,  $v \text{ ms}^{-1}$  is given by  $v = 3t^2 - 4t - 4$ , where  $t$  is the time, in seconds, after it starts to move from a fixed point O.

[Assume motion to the right is positive]

Find

- (a) the displacement, in m, of the particle at  $t = 3$  s, [3 marks]  
(b) the value of  $t$ , in second, when the particle stop instantaneously, [2 marks]  
(c) the minimum velocity, in  $\text{ms}^{-1}$ , of the particle, [2 marks]  
(d) the total distance, in m, travelled by the particle in the first 4 seconds. [3 marks]

*Suatu zarah bergerak di sepanjang suatu garis lurus dengan halajunya,  $v \text{ ms}^{-1}$  diberi oleh  $v = 3t^2 - 4t - 4$ , dengan keadaan  $t$  ialah masa, dalam saat, selepas ia mula bergerak dari suatu titik tetap O.*

[Anggapkan gerakan ke arah kanan sebagai positif]

*Cari*

- (a) *sesaran, dalam m, bagi zarah itu pada  $t = 3$  s.* [3 markah]  
(b) *nilai  $t$ , dalam saat, apabila zarah itu berhenti seketika,* [2 markah]  
(c) *halaju minimum, dalam  $\text{ms}^{-1}$ , bagi zarah itu,* [2 markah]  
(d) *jumlah jarak, dalam m, yang dilalui oleh zarah dalam 4 saat pertama.* [3 markah]

- 13 Diagram 13 shows triangle  $PQR$  and  $RST$ .  $PMRT$  and  $QNRS$  are straight lines.  $PQ$ ,  $MN$  and  $ST$  are parallel lines where  $MN = ST$ . Given  $PQ = 18.6\text{ cm}$ ,  $PM = 4.8\text{ cm}$ ,  $RT = 1.6\text{ cm}$  and  $\angle MRN = 40^\circ$ .

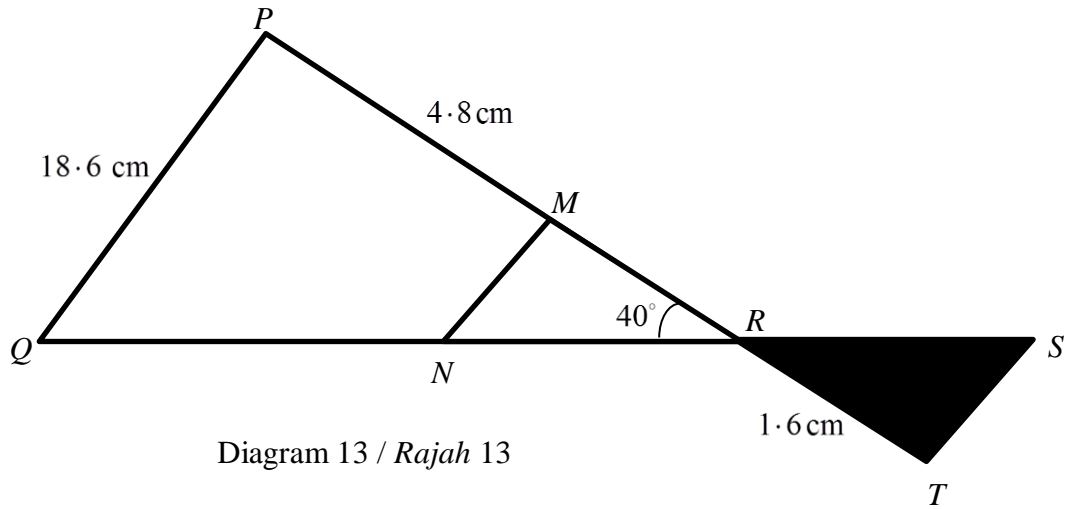


Diagram 13 / Rajah 13

Calculate

- (a)  $\angle PQN$ , [3 marks]
- (b) the length, in cm, of  $QR$ , [3 marks]
- (c) the area, in  $\text{cm}^2$ , of the triangle  $RST$ . [4 marks]

Rajah 13 menunjukkan segitiga-segitiga  $PQR$  dan  $RST$ .  $PMRT$  dan  $QNRS$  adalah garis lurus.  $PQ$ ,  $MN$  dan  $ST$  ialah garisan-garisan selari dimana  $MN = ST$ . Diberi  $PQ = 18.6\text{ cm}$ ,  $PM = 4.8\text{ cm}$ ,  $RT = 1.6\text{ cm}$  dan  $\angle MRN = 40^\circ$ .

Hitungkan

- (a)  $\angle PQN$ , [3 markah]
- (b) panjang, dalam cm, bagi  $QR$ , [3 markah]
- (c) luas, dalam  $\text{cm}^2$ , bagi segitiga  $RST$ . [4 markah]

14

Items <i>Bahan-bahan</i>	Price index in 2014 based on 2012 <i>Indeks harga pada 2014 berasaskan 2012</i>	Change in price index from 2014 to 2016 <i>Perubahan indeks harga dari 2014 ke 2016</i>	Weightages <i>Pemberat</i>
<i>P</i>	125	Increased by 20% <i>Menokok 20%</i>	2
<i>Q</i>	115	Remained unchanged <i>Tidak berubah</i>	4
<i>R</i>	108	Increased by 5% <i>Menokok 5%</i>	1
<i>S</i>	148	Decreased by 10% <i>Menyusut 10%</i>	3

Table 14 / Jadual 14

Table 14 shows the price indices of four items used in producing a type of cake in the year 2014 based on the year 2012 as well as the changes in the price indices from the year 2014 to the year 2016.

- (a) Given that the cost of item *R* in the year 2012 was RM 2.50, calculate the respective cost of item *R* in the year 2014. [2 marks]
- (b) Calculate the composite index in the year 2016 based on the year 2012. [5 marks]
- (c) If the production cost of the cake was RM 25 in the year 2014, calculate the corresponding cost of the cake in the year 2016. [3 marks]

*Jadual 14 menunjukkan indeks harga bagi empat jenis bahan yang digunakan untuk membuat sejenis kek pada tahun 2014 berasaskan tahun 2012 dan perubahan indeks harga dari tahun 2014 ke tahun 2016.*

- (a) *Diberi kos bagi bahan R pada tahun 2012 ialah RM 2.50, kira kos sepadan bagi bahan R pada tahun 2014.* [2 markah]
- (b) *Kira indeks gubahan pada tahun 2016 berasaskan tahun 2012.* [5 markah]
- (c) *Jika kos menghasilkan kek pada tahun 2014 ialah RM 25, kira kos sepadan pada tahun 2016.* [3 markah]



15 Pak Ali intends to buy  $x$  wooden chair and  $y$  plastic chairs for use in his shop. The price of a wooden chair and a plastic chair is RM 20 and RM15 respectively. The purchase of chairs is based on the following constraints:

I : The total number of chairs must not less than 50.

II : The number of plastic chairs is at least half of the number of wooden chairs bought.

III: The total allocation is RM 1500

(a) Write three inequalities, other than  $x \geq 0$  and  $y \geq 0$ , which satisfy the above constraints.

[3 marks]

(b) Using the scale of 2 cm to 10 chairs for both axes, construct and shade the region  $R$  which satisfies all the above constraints.

[3 marks]

(c) Using the graph constructed in 15(b), if he buys 30 plastic chairs, find

(i) the minimum number of wooden chair,

(ii) the maximum amount of money that could remain.

[4 marks]

*Pak Ali hendak membeli  $x$  kerusi kayu and  $y$  kerusi plastik untuk kegunaan kedainya. Harga bagi seunit kerusi kayu dan seunit kerusi plastik masing-masing ialah RM 20 dan RM15. Pembelian kerusi tersebut adalah berdasarkan kekangan berikut:*

*I : Jumlah kerusi adalah tidak kurang daripada 50.*

*II : Bilangan kerusi plastik adalah sekurang-kurangnya separuh daripada bilangan kerusi kayu yang dibeli.*

*III: Jumlah peruntukan ialah RM 1500*

(a) *Tulis tiga ketaksamaan, selain daripada  $x \geq 0$  dan  $y \geq 0$ , yang memenuhi kekangan di atas.*

[3 markah]

(b) *Dengan menggunakan skala 2 cm kepada 10 kerusi bagi kedua-dua paksi, bina dan lorek rantau  $R$  yang memenuhi semua kekangan di atas.*

[3 markah]

(c) *Menggunakan graf yang dibina di 15(b), jika dia membeli 30 kerusi plastik, cari*

*(i) bilangan minimum kerusi kayu,*

*(ii) jumlah maksimum wang baki yang tinggal.*

[4 markah]

**END OF QUESTION PAPER**

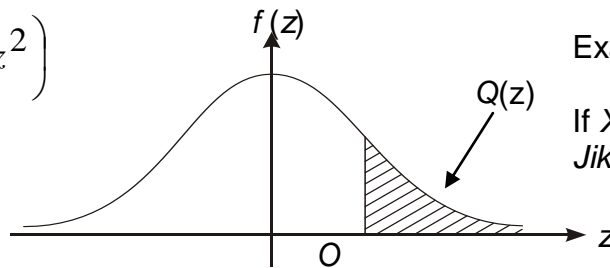
**KERTAS SOALAN TAMAT**

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

$z$										Minus / Tolak									
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
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  $P(X > k) = Q(k)$