



NAMA:

KELAS:

MODUL PINTAS
PEPERIKSAAN PERCUBAAN SPM TAHUN 2024
MATEMATIK TAMBAHAN TINGKATAN 5
Kertas 2

3472/2

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

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Kertas peperiksaan ini mengandungi tiga bahagian: Bahagian A, Bahagian B dan Bahagian C.
2. Jawapan hendaklah ditulis pada ruang jawapan yang disediakan di dalam kertas peperiksaan ini.
3. Kertas peperiksaan ini adalah dalam dwibahasa.
4. Jawapan boleh ditulis dalam bahasa Melayu atau bahasa Inggeris.
5. Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
6. Kerja mengira mesti ditunjukkan.
7. Kertas peperiksaan ini hendaklah diserahkan kepada pengawas peperiksaan pada akhir peperiksaan.

SOALAN	MARKAH PENUH	MARKAH DIPEROLEH
BAHAGIAN A		
1	7	
2	7	
3	6	
4	6	
5	8	
6	7	
7	9	
JUMLAH	50	
BAHAGIAN B		
8	10	
9	10	
10	10	
11	10	
JUMLAH	30	
BAHAGIAN C		
12	10	
13	10	
14	10	
15	10	
JUMLAH	20	
JUMLAH KESELURUHAN MARKAH		

Kertas soalan ini mengandungi 33 halaman bercetak.

RUMUS FORMULAE

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$17 \quad \text{Luas di bawah lengkung} \\ \text{Area under a curve} \\ = \int_b^a y \, dx \text{ atau (or)} \int_b^a x \, dy$$

$$18 \quad \text{Isipadu janaan} \\ \text{Volume of generation} \\ = \int_b^a \pi y^2 \, dx \text{ atau (or)} \int_b^a \pi x^2 \, dy$$

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

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

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

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

- 23 $P(X=r) = {}^nC_r p^r q^{n-r}, p+q=1$
- 24 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 Luas sektor, $L = \frac{1}{2} j^2 \theta$
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 $\csc^2 A = 1 + \cot^2 A$
 $\csc^2 A = 1 + \cot^2 A$
- 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 Luas segi tiga/ Area of triangle
 $= \frac{1}{2} ab \sin C$
- 41 Titik yang membahagi suatu tembereng garis
A 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 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 $\hat{r} = \frac{xi + yj}{\sqrt{x^2 + y^2}}$

Bahagian A**[50 markah]**

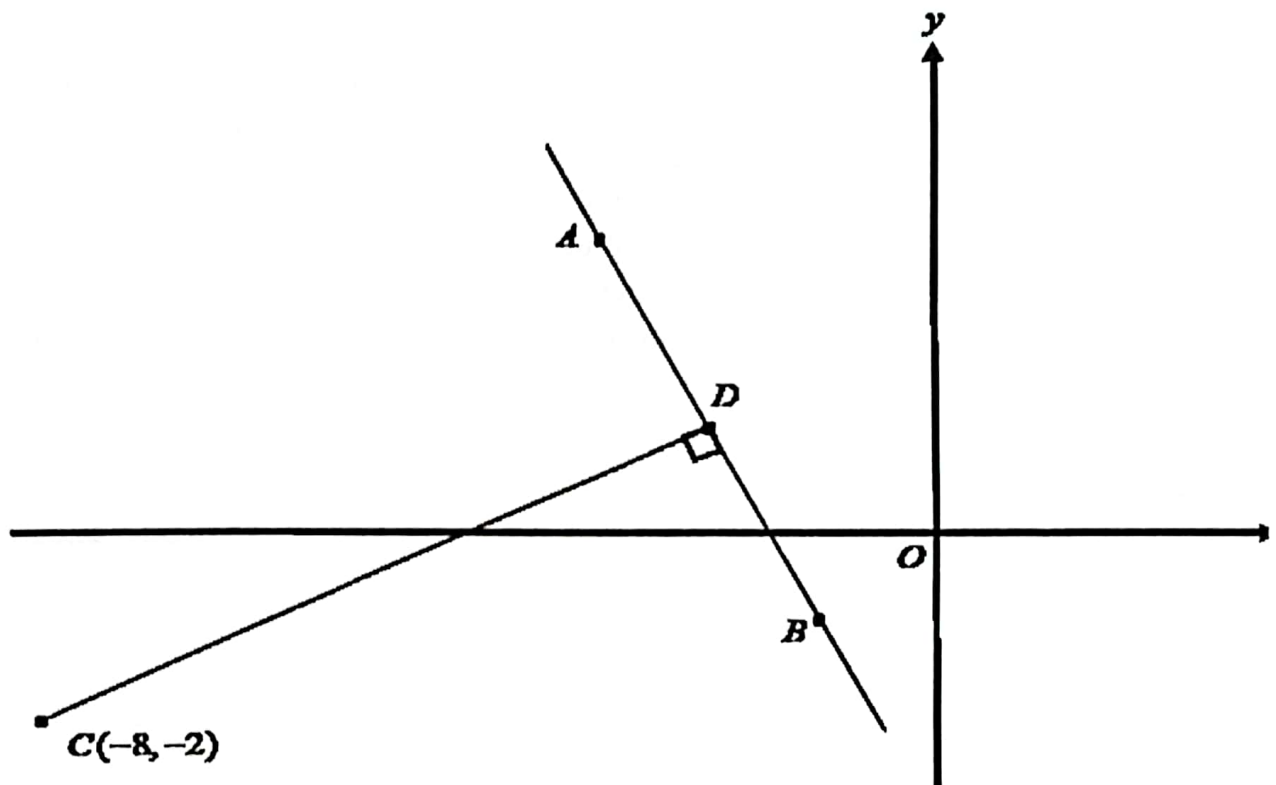
Jawab semua soalan.

- 1 Penyelesaian secara lukisan berskala tidak diterima.

Solution by scale drawing is not accepted.

Rajah 1 menunjukkan dua garis lurus. Persamaan garis lurus AB ialah $y + 2x + 3 = 0$.

Diagram 1 shows two straight lines. The equation of the straight line AB is $y + 2x + 3 = 0$



Rajah 1
Diagram 1

- (a) Cari

Find

- (i) persamaan garis lurus CD ,
the equation of the straight line CD ,
- (ii) koordinat D ,
coordinates D ,

[5 markah]
[5 marks]

- (b) Garis lurus CD dipanjangkan ke titik E , dengan keadaan $CD : DE = 3 : 2$. Cari koordinat E .

The straight line CD is extended to point E , such that $CD : DE = 3 : 2$. Find the coordinates of E .

[2 markah]

[2 marks]

Jawapan / Answer :

- 2 Seorang ahli ekonomi menganalisis pengeluaran mangkuk seramik daripada dua buah kilang iaitu Jaya Sdn. Bhd. dan Makmur Sdn. Bhd.. Hasil analisis itu mendapati jumlah jam operasi kedua-dua kilang itu setiap hari ialah 208 jam. Kilang Jaya Sdn. Bhd. memerlukan 4 jam untuk menghasilkan seunit mangkuk seramik yang dijual pada harga RM20.00. Kilang Makmur Sdn. Bhd. memerlukan 2 jam untuk menghasilkan seunit mangkuk seramik yang dijual pada harga RM25.00. Hasil darab bilangan mangkuk seramik yang dihasilkan oleh kedua-dua kilang tersebut ialah 1280 unit. Berdasarkan analisis tersebut, cari bilangan mangkuk seramik yang menghasilkan keuntungan maksimum bagi setiap kilang tersebut.

An economist analyzes the production of ceramic bowls from two factories that are Jaya Sdn. Bhd. and Makmur Sdn. Bhd. The results of the analysis found that the total operation hours per day in both factories is 208 hours. Factory Jaya Sdn. Bhd. requires 4 hours to produce a ceramic bowl that to be sold at RM20.00. Factory Makmur Sdn. Bhd. requires 2 hours to produce a ceramic bowl that to be sold at RM25.00. The product of the number of ceramic bowls produced by both factories is 1280 units. Based on the analysis, find the number of ceramic bowls that produced maximum profit for each factory.

[7 markah]

[7 marks]

Jawapan / Answer :

3 (a) Buktikan $\frac{\sin^2 x - \cos 2x + 1}{\sin x} = 3 \sin x$.

Prove that $\frac{\sin^2 x - \cos 2x + 1}{\sin x} = 3 \sin x$.

[2 markah]

[2 marks]

(b) Lakarkan graf bagi $y = 3 \sin x$ untuk $0 \leq x \leq 2\pi$.

Seterusnya dengan melukis satu garis lurus yang sesuai pada lakaran anda bagi persamaan $3 \sin x = -2$, cari bilangan penyelesaian untuk $0 \leq x \leq 2\pi$.

Sketch the graph of $y = 3 \sin x$ for $0 \leq x \leq 2\pi$.

Hence by drawing a suitable straight line on your sketch for equation $3 \sin x = -2$, find the number of solutions for $0 \leq x \leq 2\pi$.

[4 markah]

[4 marks]

Jawapan / Answer :

- 4 (a) α dan β ialah punca-punca bagi fungsi kuadratik $3x^2 - 8x + m = 4x + 3$, dengan keadaan m ialah pemalar. Jika $\alpha = 3\beta$, cari nilai m .
 α and β are the roots of the quadratic equation $3x^2 - 8x + m = 4x + 3$, where m is a constant. If $\alpha = 3\beta$, find the value of m .

[4 markah]

[4 marks]

- (b) Diberi persamaan kuadratik $p(x^2 + 16) = -4qx$ mempunyai dua punca yang sama, cari nisbah $p : q$.
Given that the quadratic equation $p(x^2 + 16) = -4qx$ has two equal roots, find the ratio of $p : q$.

[2 markah]

[2 marks]

Jawapan / Answer :

- 5 (a) Suatu fungsi f dan g ditakrifkan oleh $f : x \rightarrow 4 - x$ dan $g : x \rightarrow px^2 + q$. Jika gf ialah $gf : x \rightarrow px^2 - 16x + 26$, cari

The functions f and g are defined by $f : x \rightarrow 4 - x$ and $g : x \rightarrow px^2 + q$. If the gf is given by $gf : x \rightarrow px^2 - 16x + 26$, find

- (i) nilai p dan nilai q ,
the value of p and of q ,
- (ii) nyatakan g^2 dalam sebutan x . Seterusnya, cari imej bagi -1 .
state g^2 in terms of x . Hence, find the image of -1 .

[5 markah]

[5 marks]

- (b) Diberi $f : x \rightarrow 2 - 2x$. Cari

Given $f : x \rightarrow 2 - 2x$. Find

- (i) f^{-1} ,
- (ii) fungsi g jika $gf^{-1} : x \rightarrow x^2 - 4x + 5$.
the function g such that $gf^{-1} : x \rightarrow x^2 - 4x + 5$.

[3 markah]

[3 marks]

Jawapan / Answer :

5. Jawapan / Answer :



Figure 1

(The graph is for reference)

5. A car starts from rest and moves in a straight line with constant acceleration. It covers a distance of 100 m in 10 s. Find the acceleration of the car.

5. Sebuah kereta bermula dari keadaan rehat dan bergerak dalam garis lurus dengan pecutan malar. Ia menempuh jarak 100 m dalam 10 s. Cari pecutan kereta.

[3 marks]

[3 marks]

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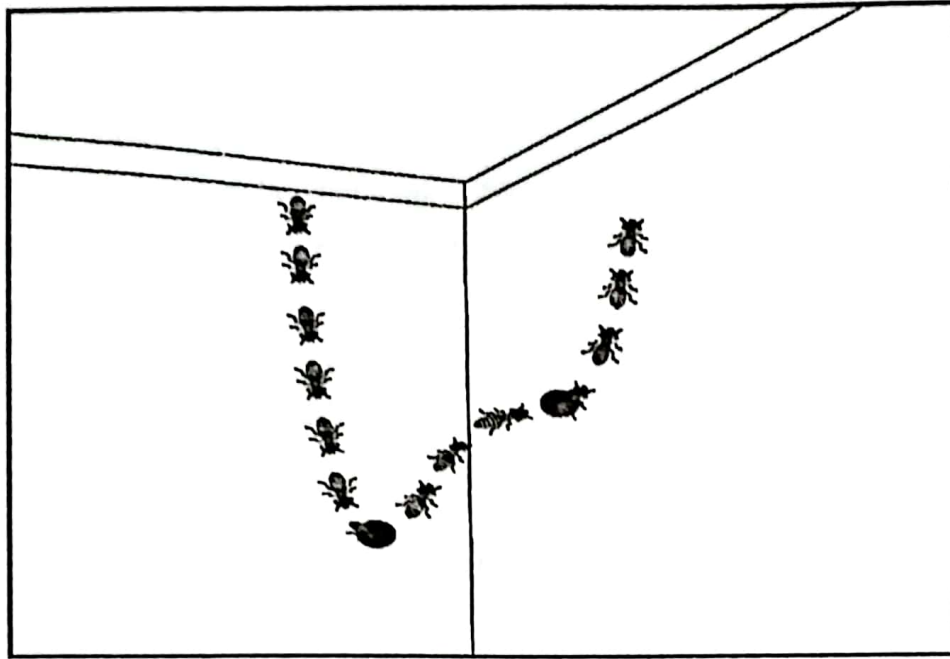
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- 6 Danial membuat kajian tentang laluan anai-anai di dinding rumahnya. Rajah 2 menunjukkan laluan anai-anai tersebut yang diwakili oleh lengkung $y = x(x-2)^3$.
Danial made a study about the path of termites on the wall of his house. Diagram 2 shows the path of the termites represented by a curve $y = x(x-2)^3$.



Rajah 2
 Diagram 2

- (a) Tentukan fungsi kecerunan bagi laluan anai-anai yang ditunjukkan dalam Rajah 2.

Determine the gradient function of the termite's path shown in the Diagram 2.

[2 markah]

[2 marks]

- (b) Anai-anai tersebut berhenti pada titik pegun $P(x_1, y_1)$ dan $Q(x_2, y_2)$ untuk membina lubang. Cari koordinat titik P dan Q , dengan keadaan $x_2 > x_1$.

The termites stop at stationary points $P(x_1, y_1)$ and $Q(x_2, y_2)$ to build hole. Find the coordinates of points P and of Q such that $x_2 > x_1$.

[3 markah]

[3 marks]

- (c) Seterusnya, dengan menggunakan kaedah lakaran tangen tentukan sifat bagi titik pegun Q .

Hence, by using the tangent sketch method determine the properties of the stationary point Q .

[2 markah]

[2 marks]

- 7 Rajah 3 menunjukkan bentangan segulung kertas dinding yang bercorak segi tiga sama kaki. Diberi bahawa tapak segi tiga pertama ialah a cm dan tapak setiap segi tiga berikutnya bertambah sebanyak d cm.

Diagram 3 shows a net of roll of wallpaper with an isosceles triangle pattern. Given that the base of the first triangle is a cm and the base of the next triangle increases by d cm.



Rajah 3
Diagram 3

- (a) Terbitkan bahawa panjang tapak bagi segi tiga ke- n ialah $T_n = a + (n-1)d$.

Derive that the length of the base of the n^{th} triangle is $T_n = a + (n-1)d$.

[3 markah]

[3 marks]

- (b) Pada bentangan tersebut, segi tiga yang ke-25 merupakan segi tiga terakhir dengan luas 96 cm^2 dan diberi bahawa $a = 24d$.

On the net, the 25th triangle is the last triangle with the area of 96 cm^2 and given that $a = 24d$.

- (i) Cari nilai d , dalam cm,

Find the value of d , in cm,

- (ii) Anas ingin mengirim sejumlah gulungan kertas dinding itu kepada rakannya melalui sebuah syarikat kurier. Jadual 1 menunjukkan maklumat berkaitan caj penghantaran.

Anas wants to send a number of rolls of the wallpaper to his friend through a courier company. Table 1 shows an information related to parcel delivery charges.

Jisim Mass	0-3.00 kg	Setiap 500 gm berikutnya Every subsequent 500 gm
Kadar (RM) Rate (RM)	7.50	1.25

Jadual 1

Table 1

Jika Anas mempunyai RM12 dan jisim kertas itu bagi setiap cm^2 ialah $4 \times 10^{-5} \text{ kg}$, hitung bilangan maksimum gulungan kertas yang boleh dikirim.

If Anas has RM12 and the mass of the paper per cm^2 is $4 \times 10^{-5} \text{ kg}$, calculate the maximum number of rolls of the paper that can be sent.

[6 markah]

[6 marks]

Jawapan / Answer :

Bahagian B**[30 markah]**

Bahagian ini mengandungi empat soalan. Jawab tiga soalan.

- 8 Jadual 2 menunjukkan nilai– nilai eksperimen untuk dua pemboleh ubah x dan y yang dihubungkan oleh persamaan $y = p\sqrt{x} + qx$ dengan keadaan p dan q adalah pemalar. *Table 2 shows the values of an experiment for two variables x and y which are related by $y = p\sqrt{x} + qx$ where p and q are constants.*

x	1	2	3	4	5	6
y	0.48	1.07	1.61	2.30	2.88	3.65

Jadual 2

Table 2

- (a) Berdasarkan Jadual 2, bina satu jadual bagi nilai-nilai $\frac{y}{\sqrt{x}}$ dan $\sqrt{x}$.

Based on Table 2, construct a table for the values of $\frac{y}{\sqrt{x}}$ and $\sqrt{x}$.

[2 markah]

[2 marks]

- (b) Plotkan $\frac{y}{\sqrt{x}}$ melawan $\sqrt{x}$ dengan menggunakan skala 2 cm kepada 0.5 unit pada paksi $-\sqrt{x}$ dan 2 cm kepada 0.2 unit pada paksi $-\frac{y}{\sqrt{x}}$.

Seterusnya, lukiskan garis lurus penyuaian terbaik.

Plot $\frac{y}{\sqrt{x}}$ against $\sqrt{x}$ using scale 2 cm to 0.5 unit on $\sqrt{x}$ – axis and 2 cm to 0.2

unit on $\frac{y}{\sqrt{x}}$ – axis.

Hence, draw the line of best fit.

[3 markah]

[3 marks]

- (c) Dengan menggunakan graf di (b), cari
By using the graph in (b), find

- (i) nilai p dan nilai q ,
values of p and of q ,

(ii) nilai $\sqrt{x}$ apabila $\frac{y}{\sqrt{x}} = 0.54$.

value of $\sqrt{x}$ when $\frac{y}{\sqrt{x}} = 0.54$.

[5 markah]
[5 marks]

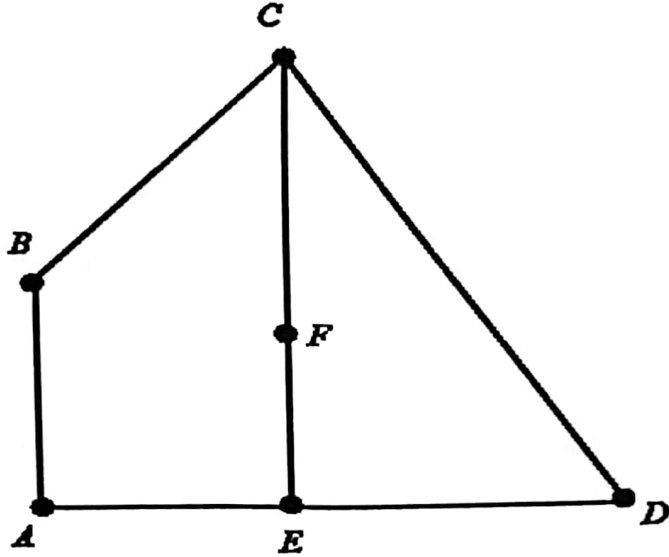
Jawapan / Answer :



Diagram
Diagram

- 9 Rajah 4 menunjukkan sebuah segiempat selari $ABCD$ dengan keadaan AED dan EFC merupakan garis lurus. Diberi bahawa $\overrightarrow{AB} = 20\mathbf{v}$, $\overrightarrow{AD} = 32\mathbf{u}$, $\overrightarrow{DC} = -24\mathbf{u} + 25\mathbf{v}$, $\overrightarrow{AE} = \frac{1}{4}\overrightarrow{AD}$ dan $\overrightarrow{EF} = \frac{3}{5}\overrightarrow{EC}$.

Diagram 4 shows a quadrilateral $ABCD$ where AED and EFC are straight lines. It is given that $\overrightarrow{AB} = 20\mathbf{v}$, $\overrightarrow{AD} = 32\mathbf{u}$, $\overrightarrow{DC} = -24\mathbf{u} + 25\mathbf{v}$, $\overrightarrow{AE} = \frac{1}{4}\overrightarrow{AD}$ and $\overrightarrow{EF} = \frac{3}{5}\overrightarrow{EC}$.



Rajah 4
Diagram 4

- (a) Ungkapkan dalam sebutan $\mathbf{u}$ dan $\mathbf{v}$,
Express in terms of $\mathbf{u}$ and $\mathbf{v}$,

(i) $\overrightarrow{BD}$

(ii) $\overrightarrow{BF}$

[3 markah]
[3 marks]

- (b) (i) Tunjukkan bahawa titik-titik B , F dan D adalah segaris.
Show that the points B , F and D are collinear.

- (ii) Diberi $|\mathbf{u}| = 3$ unit dan $|\mathbf{v}| = 2$ unit, cari $|\overrightarrow{BD}|$.

Given $|\mathbf{u}| = 3$ units and $|\mathbf{v}| = 2$ units, find $|\overrightarrow{BD}|$.

[4 markah]
[4 marks]



(c) Jika DC dipanjangkan ke satu titik G dengan keadaan $\overrightarrow{DG} = m\overrightarrow{DC}$ dan $\overrightarrow{AG} = 50\mathbf{y} - 16\mathbf{u}$. Cari nilai m .

If DC is extended to a point G such that $\overrightarrow{DG} = m\overrightarrow{DC}$ and $\overrightarrow{AG} = 50\mathbf{y} - 16\mathbf{u}$. Find the value of m .

[3 markah]
[3 marks]

Jawapan / Answer :



Diagram
2 marks

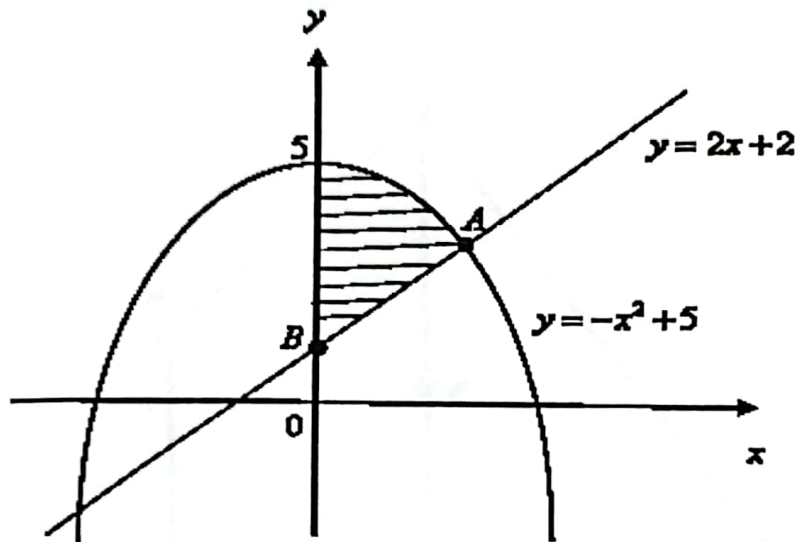
[3 marks]
[3 marks]

[4 marks]
[4 marks]

[4 marks]
[4 marks]

- 10 Rajah 5 menunjukkan garis lurus $y = 2x + 2$ yang bersilang dengan lengkung $y = -x^2 + 5$ pada titik A dan paksi- y pada titik B.

Diagram 5 shows the straight line $y = 2x + 2$ intersects the curve $y = -x^2 + 5$ at point A and y -axis at point B.



Rajah 5
Diagram 5

Cari
Find

- (a) koordinat A,
the coordinates of A,
- [2 markah]
[2 marks]
- (b) luas kawasan berlorek,
the area of the shaded region,
- [4 markah]
[4 marks]
- (c) isi padu kisaran yang dijanakan, dalam sebutan π , apabila rantau berlorek itu dikisarkan 360° pada paksi- y .
the volume of revolution generated, in terms of π , when the shaded region is revolved through 360° about the y -axis.

[4 markah]
[4 marks]

Jawapan / Answer :

- 11 (a) Jisim tembikai yang dihasilkan di sebuah dusun bertaburan normal dengan min 2.2 kg dan sisihan piawai 0.3 kg. Buah tembikai itu dikelaskan kepada gred A, B dan C mengikut jisimnya:

The masses of watermelons produced in an orchard are normally distributed with a mean of 2.2 kg and a standard deviation of 0.3 kg. The watermelons are classified into grades A, B and C according to their masses:

Gred A > Gred B > Gred C

Grade A > Grade B > Grade C

- (i) Jisim minimum bagi sebiji tembikai gred A ialah 2.6 kg. Jika sebiji tembikai dipilih secara rawak dari dusun itu, cari kebarangkalian bahawa tembikai itu bergred A.

The minimum mass of a grade A watermelon is 2.6 kg. If a watermelon is picked randomly from the orchard, find the probability that the watermelon is of grade A.

- (ii) Cari jisim minimum, dalam kg, bagi buah tembikai gred B jika 20% daripada buah tembikai itu adalah gred C.

Find the mass, in kg, of a grade B watermelon if 20% of the watermelons are of grade C.

[5 markah]

[5 marks]

- (b) Dalam suatu permainan bola keranjang, didapati bahawa Johan mendapat 40% kejayaan daripada jumlah percubaan yang dia lakukan.

In a basketball game, it is found that Johan attains 40% of success of the total trials he did.

Hitung

Calculate

- (i) kebarangkalian bahawa Johan mendapat tepat 5 kejayaan daripada 6 percubaan,

the probability that Johan attains exactly 5 successes from 6 trials,

- (ii) bilangan percubaan yang perlu dia lakukan supaya kebarangkalian kejayaan lebih daripada 0.99.

the number of trials he has to make so that the probability of success is more than 0.99.

[5 markah]

[5 marks]

Jawapan / Answer :

1. The first part of the question is about the definition of a function. A function is a relation between a set of inputs (the domain) and a set of possible outputs (the codomain) such that each input is related to exactly one output.
2. The second part of the question is about the domain and codomain of a function. The domain is the set of all possible inputs, and the codomain is the set of all possible outputs.
3. The third part of the question is about the range of a function. The range is the set of all possible outputs that the function can produce.
4. The fourth part of the question is about the graph of a function. The graph is a visual representation of the function, showing the relationship between the input and output values.
5. The fifth part of the question is about the properties of a function. A function can be one-to-one, onto, or both. A one-to-one function is a function where each input is related to exactly one output, and no two different inputs are related to the same output. An onto function is a function where every element in the codomain is related to at least one element in the domain. A function that is both one-to-one and onto is called a bijective function.

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[Mark: 11]

[Time: 11]

Bahagian C**[20 markah]**

Bahagian ini mengandungi empat soalan. Jawab dua soalan.

- 12 Sebuah kilang menghasilkan pengecas jenis S dan T dalam sehari.
Jadual 3 menunjukkan maklumat berkaitan pengecas yang dihasilkan.

A factory produces type S and T charger in a day.

Table 3 shows information regarding the charger produced.

Pengecas Charger	Bilangan pengecas (unit) Number of charger (unit)	Kos seunit (RM) Cost per unit (RM)
S	x	10
T	y	20

Jadual 3

Table 3

Masa yang diperlukan untuk menghasilkan seunit pengecas jenis S dan seunit pengecas jenis T masing-masing ialah 9 minit dan 7 minit.

The time of production a unit of type S and T charger are 9 minutes and 7 minutes respectively.

Penghasilan pengecas di kilang itu adalah berdasarkan kekangan yang berikut:

The charger produced by the factory satisfy the following constraints:

I	Jumlah bilangan pengecas yang dihasilkan mesti melebihi p unit dalam sehari. <i>The total number of chargers produced must be more than p units in a day.</i>
II	Bilangan pengecas jenis S yang dihasilkan kurang daripada bilangan pengecas T selebih-lebihnya q unit. <i>The number of type S chargers produced is less than the number of type T charger by at most q units.</i>
III	Jumlah masa yang digunakan untuk menghasilkan pengecas ialah 10 jam 30 minit sehari. <i>The total time used to produce the chargers is 10 hours 30 minutes per day.</i>

- (a) Kekangan I dan kekangan II ditunjukkan pada graf pada halaman 25. Rantau berlorek mewakili titik-titik yang memenuhi kedua-dua kekangan itu. Nyatakan nilai p dan nilai q .

Constraints I and II are shown on the graph on page 25. The shaded region represents the points which satisfy both constraints.

State the value of p and of q .

[1 markah]

[1 mark]

- (b) Tulis satu ketaksamaan bagi kekangan III, selain daripada $x \geq 0$ dan $y \geq 0$. Seterusnya, pada halaman 25, bina dan label rantau R yang memenuhi semua kekangan itu.

Write an inequality for constraint III, other than $x \geq 0$ and $y \geq 0$. Hence, on page 25, construct and label the region R which satisfies all the constraints.

[3 markah]

[3 marks]

- (c) Gunakan graf yang dibina di (b) untuk menjawab soalan – soalan berikut:

Use the graph constructed in (b) to answer the following questions:

- (i) Pada satu hari berlaku kesilapan teknikal yang menyebabkan penghasilan pengecas T ialah 3 kali ganda bilangan pengecas S . Tentukan bilangan maksimum bagi pengecas S yang dihasilkan pada hari itu.

On a particular day there was a technical error that caused the production of type T charger is 3 times the production of type S charger. Determine the maximum number of type S charger produced on that day.

- (ii) Diberi bahawa jumlah kos harian yang ditanggung oleh kilang dalam penghasilan dua jenis pengecas itu ialah RM k , ungkapkan k dalam sebutan x dan y . Seterusnya, lukis fungsi objektif itu dan cari kos maksimum penghasilan dua jenis pengecas tersebut.

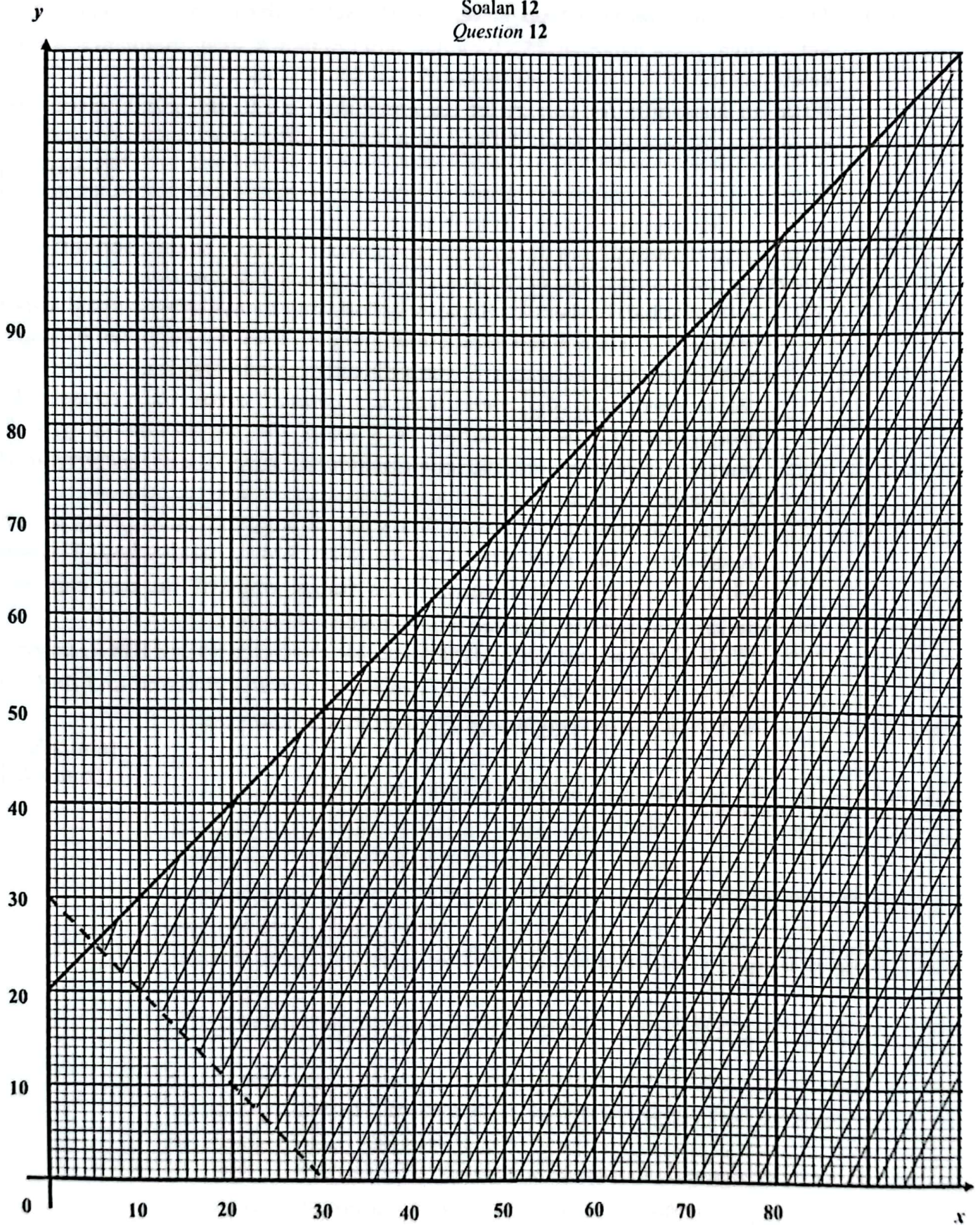
Given that the total daily cost to produce the chargers are RM k , express k in terms of x and y . Hence, draw the objective function and find the maximum cost of producing the two types of chargers.

[6 markah]

[6 marks]

Jawapan / Answer :

Soalan 12
Question 12



- 13 Jadual 4 menunjukkan indeks harga bagi tahun 2020 dan 2022 berasaskan tahun 2018 untuk tiga jenis bahan A , B , dan C yang digunakan untuk membuat sejenis kasut. *Table 4 shows the price indices for the year 2020 and 2022 based on the year 2018 of three materials A , B , and C used in making a type of shoe.*

Bahan Material	Indeks harga pada tahun 2020 berasaskan tahun 2018 <i>Price index in the year 2020 based on the year 2018</i>	Indeks harga pada tahun 2022 berasaskan tahun 2018 <i>Price index in the year 2022 based on the year 2018</i>
A	106	120
B	105	125
C	110	m

Jadual 4
Table 4

- (a) Harga bahan C pada tahun 2018 ialah RM12.00 dan harganya pada tahun 2022 ialah RM15.60.
The price of material C in the year 2018 is RM12.00 and its price in the year 2022 is RM15.60.

Cari
Find

- (i) nilai m ,
the value of m ,
- (ii) harga bagi bahan C pada tahun 2020.
the price of material C in the year 2020.

[3 markah]
[3 marks]

- (b) Indeks gubahan untuk kos pengeluaran kasut itu pada tahun 2020 berasaskan tahun 2018 ialah 106.7. Nisbah bahan-bahan A , B dan C yang digunakan ialah $2:h:3$.
The composite index for the production cost of the shoe in the year 2020 based on the year 2018 is 106.7. The ratio of materials A , B and C used are $2:h:3$.

Cari

Find

- (i) nilai h ,
the value of h ,
- (ii) harga sepadan bagi kasut itu pada tahun 2018 jika harga kasut itu pada tahun 2020 ialah RM58.20.
the corresponding price of the shoe in the year 2018 if the price of shoe in the year 2020 is RM58.20.

[5 markah]

[5 marks]

- (c) Cari indeks harga bagi bahan B pada tahun 2022 berasaskan tahun 2020.
Find the price index of material B in the year 2022 based on the year 2020.

[2 markah]

[2 marks]

Jawapan / Answer :

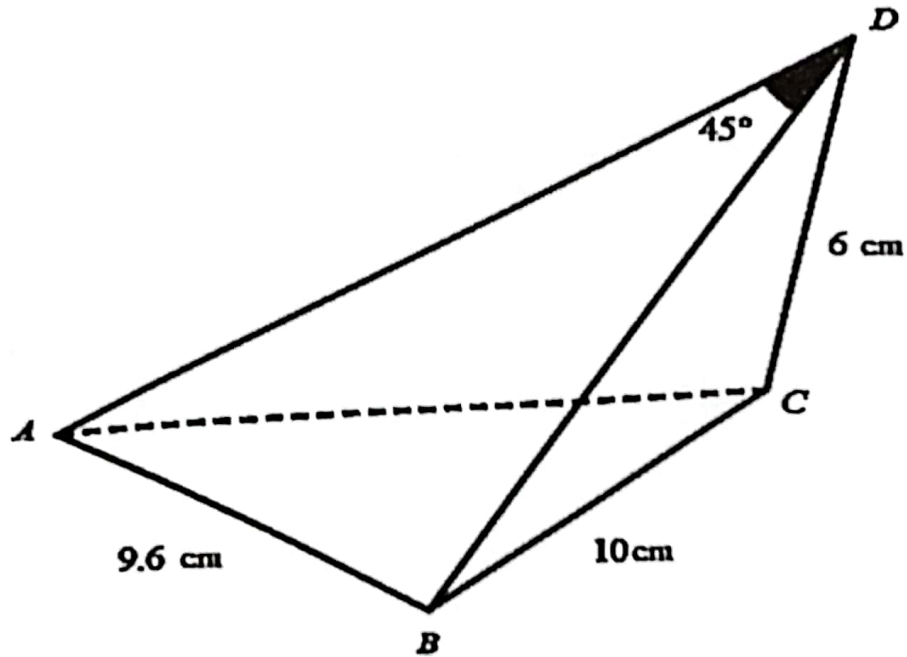
Jawapan / Answer :



- 14 Penyelesaian secara lukisan berskala tidak diterima.
Solutions by scale drawing are not accepted.

Rajah 6 menunjukkan sebuah piramid bertapak segi tiga ABC yang terletak pada satah mengufuk.

Diagram 6 shows a pyramid with triangular base of ABC which lies on a horizontal plane.



Rajah 6
 Diagram 6

Diberi bahawa luas segi tiga DBC adalah 28 cm^2 dan $\angle DCB$ merupakan sudut cakak.
Given that the area of triangle DBC is 28 cm^2 and $\angle DCB$ is obtuse.

Cari

Find

- (a) (i) $\angle DCB$,
 (ii) panjang, dalam cm, bagi BD ,
the length, in cm, of BD ,
 (iii) $\angle ABD$.

[6 markah]
 [6 marks]

- (b) Diberi bahawa luas ABD ialah 52.45 cm^2 . Satu titik E dibina di antara garisan A dan B dengan keadaan $EA = EB$. Ia disambungkan ke titik C dengan keadaan $\angle CDE = 15^\circ$. Cari sudut di antara satah condong ABD dan satah ABC .

Given that the area of ABD is 52.45 cm^2 . A point E is constructed between lines A and B such that $EA = EB$. Its connect to the point C such that $\angle CDE = 15^\circ$. Find the angle between inclined plane ABD and plane ABC .

[4 markah]

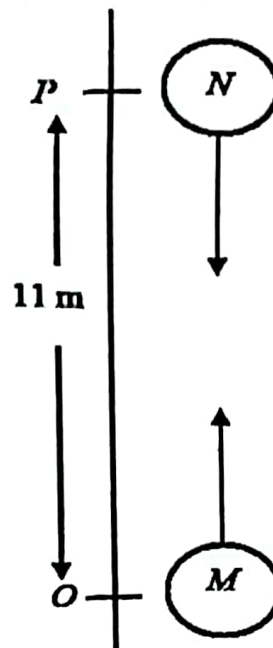
[4 marks]

Jawapan / Answer :



- 15 Rajah 7 menunjukkan kedudukan awal dan arah pergerakan zarah M dan zarah N . kedua-dua mula bergerak serentak.

Diagram 7 shows the initial position and direction of motion of particle M and particle N . both particles start moving simultaneously.



Rajah 7
Diagram 7

Halaju bagi zarah M , $v_M \text{ ms}^{-1}$, diberi oleh $v_M = 9t^2 + 10$ dan sesaran bagi zarah N , $s_N \text{ m}$, dari titik P diberi oleh $s_N = 3t^3 - t$, dengan keadaan t ialah masa dalam saat selepas M melalui titik O dan zarah N melalui titik P .

The velocity of particle M , $v_M \text{ ms}^{-1}$ is given by $v_M = 9t^2 + 10$ and displacement of particle N , $s_N \text{ m}$, from point p is given by $s_N = 3t^3 - t$, where t is time in seconds after particle M passes point O and particle N passes P .

- (a) Cari halaju awal, dalam ms^{-1} , bagi zarah N
Find the initial velocity, in ms^{-1} , of particle N

[2 markah]
[2 marks]

- (b) Cari jumlah jarak, dalam m, yang dilalui oleh zarah N dalam 2 saat pertama.
Find the total distance, in m, travelled by particle N in the first 2 seconds.

[4 markah]
[4 marks]

- (c) Hitung jarak, dalam m, bagi zarah-zarah itu dari titik P apabila zarah M dan zarah N bertemu.

Calculate the distance, in m, of the particles from P when particle M and particle N meet.

[4 markah]

[4 marks]

Jawapan / Answer :

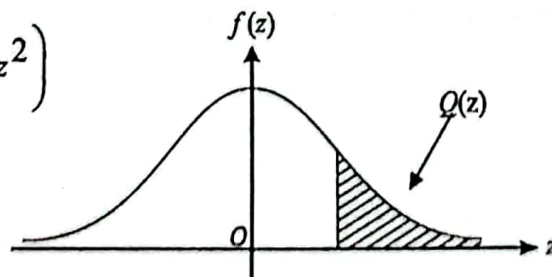
KERTAS PEPERIKSAAN TAMAT

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