

SULIT

Nama :

Tingkatan :

JABATAN PELAJARAN WILAYAH PERSEKUTUAN KUALA LUMPUR**PEPERIKSAAN PERCUBAAN SPM 2008****3472/1****ADDITIONAL MATHEMATICS****Kertas 1****September****2 jam****Dua jam****JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. *Tuliskan nama dan tingkatan anda pada ruang yang disediakan.*
2. *Kertas soalan 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 Melayu atau bahasa Inggeris.*
5. *Calon dikehendaki membaca maklumat di halaman 2 kertas soalan ini.*

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

Kertas soalan ini mengandungi 17 halaman bercetak

INFORMATION FOR CANDIDATES

1. *This question paper consists of **25** questions.*
2. *Answer **all** questions.*
3. *Give only **one** answer for each question.*
4. *Write your answers clearly in the spaces provided in this question paper.*
5. *Show your working. It may help you to get marks.*
6. *If you wish to change your answer, cross out the work that you have done. Then write down the new answer.*
7. *The diagrams in the questions provided are not drawn to scale unless stated.*
8. *The marks allocated for each question are shown in brackets.*
9. *A list of formulae is provided on pages 3 to 5.*
10. *A booklet of four-figure mathematical tables is provided.*
11. *You may use a non-programmable scientific calculator.*
12. *Hand in this question paper to the invigilator at the end of the examination.*

MAKLUMAT UNTUK CALON

1. *Kertas soalan ini mengandungi **25** soalan.*
2. *Jawab **semua** soalan.*
3. *Bagi setiap soalan berikan **satu** jawapan sahaja.*
4. *Jawapan anda hendaklah ditulis dengan jelas dalam ruangan yang disediakan dalam kertas soalan ini.*
5. *Tunjukkan langkah-langkah penting dalam kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.*
6. *Sekiranya anda hendak menukar jawapan, batalkan dengan kemas jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.*
7. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
8. *Markah yang diperuntukkan bagi setiap soalan ditunjukkan dalam kurungan.*
9. *Satu senarai rumus disediakan di halaman 3 hingga 5.*
10. *Sebuah buku sifir matematik empat angka disediakan.*
11. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*
12. *Serahkan kertas soalan ini kepada pengawas peperiksaan pada akhir peperiksaan.*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CALCULUS (KALKULUS)

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

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

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

$$4 \quad \text{Area under the curve} \\ \text{(Luas di bawah lengkung)} \\ = \int_a^b y \, dx \quad \text{or (atau)} \\ = \int_a^b x \, dy$$

$$5 \quad \text{Volume generated} \\ \text{(Isipadu janaan)} \\ = \int_a^b \pi y^2 \, dx \quad \text{or (atau)} \\ = \int_a^b \pi x^2 \, dy$$

STATISTICS (STATISTIK)

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

12 Mean (min), $\mu = np$

13
$$\sigma = \sqrt{npq}$$

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

GEOMETRY (GEOMETRI)

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

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

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

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

4 Area of triangle (Luas segitiga)

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

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

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

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, $A = \frac{1}{2}j^2\theta$
- 3 $\sin^2 A + \cos^2 A = 1$
 $\sin^2 A + \text{kos}^2 A = 1$
- 4 $\sec^2 A = 1 + \tan^2 A$
 $\text{sek}^2 A = 1 + \tan^2 A$
- 5 $\text{cosec}^2 A = 1 + \cot^2 A$
 $\text{kosek}^2 A = 1 + \text{kot}^2 A$
- 6 $\sin 2A = 2 \sin A \cos A$
 $\sin 2A = 2 \sin A \text{kos} A$
- 7 $\cos 2A = \cos^2 A - \sin^2 A$
 $= 2\cos^2 A - 1$
 $= 1 - 2\sin^2 A$
 $\text{kos} 2A = \text{kos}^2 A - \sin^2 A$
 $= 2\text{kos}^2 A - 1$
 $= 1 - 2\sin^2 A$
- 8 $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$
 $\sin(A \pm B) = \sin A \text{kos} B \pm \text{kos} A \sin B$
- 9 $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$
 $\text{kos}(A \pm B) = \text{kos} A \text{kos} B \mp \sin A \sin B$
- 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 $a^2 = b^2 + c^2 - 2bc \cos A$
 $a^2 = b^2 + c^2 - 2bc \text{kos} A$
- 14 Area of triangle = $\frac{1}{2}ab \sin C$
Luas segitiga = $\frac{1}{2}ab \sin C$

For
Examiner's
Use

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

1

$$R = \{ 2, 3, 4 \}$$

$$S = \{ 6, 8, 10, 12 \}$$

Based on the above information, the relation between R and S is defined by the set of ordered pairs $\{(2, 6), (3, 8), (3, 10), (4, 12)\}$.

Berdasarkan maklumat di atas, hubungan R dan S ditakrifkan oleh set pasangan tertib $\{(2, 6), (3, 8), (3, 10), (4, 12)\}$.

State

Nyatakan

- a) the images of 3,
imej-imej bagi 3,
b) the object of 12.
objek bagi 12.

[2 marks]

[2 markah]

1

2

Answer / Jawapan : a)

b)

- 2 Function f and g are defined as $f : x \rightarrow 3x - 2$ and $g : x \rightarrow \frac{1-x}{x}$, $x \neq 0$.

Find $gf(x)$.

Fungsi f dan g ditakrifkan oleh $f : x \rightarrow 3x - 2$ dan $g : x \rightarrow \frac{1-x}{x}$, $x \neq 0$.

Cari $gf(x)$.

[3 marks]

[3 markah]

2

3

Answer / Jawapan :

SULIT**7****3472/1**For
Examiner's
Use

- 3** Given the function $f : x \rightarrow hx - 3$ and $f^{-1} : x \rightarrow 2x + k$ where h and k are constants find the value of h and of k . [3 marks]

Diberi fungsi $f : x \rightarrow hx - 3$ dan $f^{-1} : x \rightarrow 2x + k$ dengan keadaan h dan k adalah pemalar, carikan nilai h dan k . [3 markah]

Answer / Jawapan : $h = \dots\dots\dots$ $k = \dots\dots\dots$ **3**

3

- 4** A quadratic equation $(p - 1)x^2 - 8x = 4$ has two different roots. Find the range of values of p . [3 marks]

Suatu persamaan kuadratik $(p - 1)x^2 - 8x = 4$ mempunyai dua punca berbeza. Cari julat nilai p . [3 markah]

Answer / Jawapan:.....

4

3

- 5** Find the range of the values of x for $(x - 5)(x + 1) \geq 16$. [3 marks]

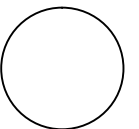
Cari julat nilai x bagi $(x - 5)(x + 1) \geq 16$. [3 markah]

5

3

Answer / Jawapan:

[Lihat sebelah



For
Examiner's
Use

- 6 Diagram 1 shows the graph of $f(x) = -\frac{1}{2}(x+h)^2 + k$, where c , h and k are constants.
Rajah 1 menunjukkan graf bagi $f(x) = -\frac{1}{2}(x+h)^2 + k$ dengan keadaan c , h dan k adalah pemalar.

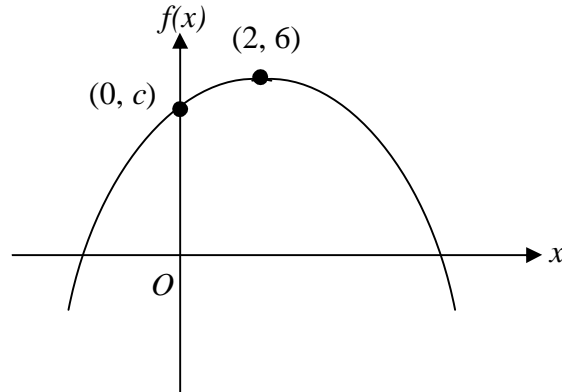


Diagram 1
Rajah 1

- a) Given that $(2, 6)$ is the maximum point of the graph, state the value of h and of k .
Diberi $(2, 6)$ adalah titik maksimum bagi graf tersebut, nyatakan nilai h dan nilai k .
- b) The graph intersects the $f(x)$ -axis at $(0, c)$, find the value of c .
Graf tersebut menyalang paksi- $f(x)$ pada $(0, c)$, cari nilai c .

[4 marks]

[4 markah]

Answer / Jawapan: (a) $h = \dots\dots\dots$

$k = \dots\dots\dots$

(b) $c = \dots\dots\dots$

6

4

- 7 Solve the equation $5^{2x+1} = 8^x$. [3 marks]
Selesaikan persamaan $5^{2x+1} = 8^x$. [3 markah]

7

3

Answer /Jawapan:

SULIT**9****3472/1**For
Examiner's
Use

8 Solve the equation $\log_3 x - 4\log_x 3 + 3 = 0$.

[4 marks]

Selesaikan persamaan $\log_3 x - 4\log_x 3 + 3 = 0$.

[4 markah]

8

4

Answer / Jawaban: $x = \dots\dots\dots$

9 The third and the fifth terms of a geometric progression are 108 and 12 respectively.

Sebutan ketiga dan kelima dalam suatu jangjang geometri ialah 108 dan 12 masing-masing.

Given that all the terms are positive, find the

Diberi semua sebutan adalah positif, cari

(a) common ratio,

beza sepunya,

(b) first term.

sebutan pertama.

[4 marks]

[4 markah]

9

4

Answer / Jawaban: (a)

(b)

10 Given that $x + 1$, 12, $4x + 4$ are three consecutive terms of a geometric progression, find the possible values of x .

[4 marks]

Diberi $x + 1$, 12, $4x + 4$ adalah tiga sebutan berturut-turut bagi suatu jangjang geometri, cari nilai x yang mungkin .

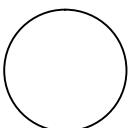
[4 markah]

10

4

Answer / Jawaban:

[Lihat sebelah]



3472/1

SULIT

For
Examiner's
Use

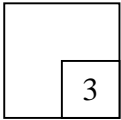
- 11 The sum for the first six terms of an arithmetic progression is 39.
If the sixth term is 8, find the first term.

[3 marks]

Hasil tambah enam sebutan pertama suatu jangjang aritmetik ialah 39. Jika sebutan keenam ialah 8, cari sebutan pertama.

[3 markah]

11



Answer /Jawapan:

- 12 Diagram 2 shows the straight line obtained by plotting $\log_4 y$ against x . The variables x and y are related by the equation $y = A^{bx+1}$ where A and b are constants.

Rajah 2 menunjukkan garis lurus yang diperolehi dengan memplot $\log_4 y$ melawan x . Pembolehubah x dan y dihubungkan oleh persamaan $y = A^{bx+1}$ dengan keadaan A dan b adalah pemalar.

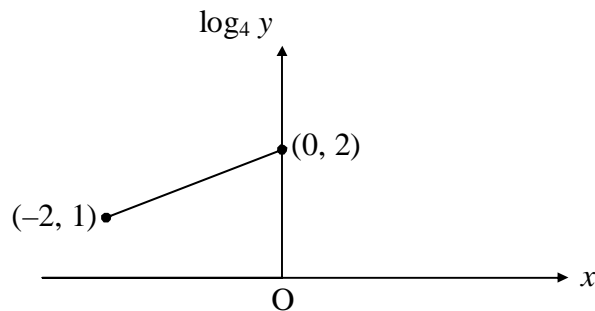


Diagram 2
Rajah 2

Find the value of

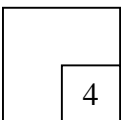
Cari nilai bagi

- (a) A ,
(b) b .

[4 marks]

[4 markah]

12



Answer /Jawapan: (a) $A = \dots\dots\dots$

(b) $b = \dots\dots\dots$

SULIT**11****3472/1**For
Examiner's
Use

- 13** Two straight lines $\frac{x}{a} + \frac{y}{6} = 1$ and $y = 2x - 3$ are perpendicular to each other, find the value of a . [2 marks]

Dua garis lurus $\frac{x}{a} + \frac{y}{6} = 1$ dan $y = 2x - 3$ adalah berserenjang, cari nilai a .

[2 markah]

13Answer / Jawapan: $a = \dots\dots\dots$

2

- 14** Given that points $P(-6, -8)$, $Q(-4, -4)$ and $R(k, -14)$ are the vertices of a triangle.

Diberi bahawa $P(-6, -8)$, $Q(-4, -4)$ dan $R(k, -14)$ adalah bucu-bucu sebuah segitiga.

- (a) Express the area of ΔPQR in terms of k .
Ungkapkan luas ΔPQR dalam sebutan k .
- (b) Find the value of k when the points P , Q and R are collinear.
Carikan nilai k apabila P , Q and R adalah segaris.

[4 marks]
[4 markah]**14**

4

Answer / Jawapan : (a).....

(b).....

[Lihat sebelah
SULIT

3472/1

For
Examiner's
Use

- 15 Diagram 3 shows a parallelogram PQRS where QTS is a straight line.
Rajah 3 menunjukkan sebuah segiempat selari PQRS dengan keadaan QTS ialah garis lurus.

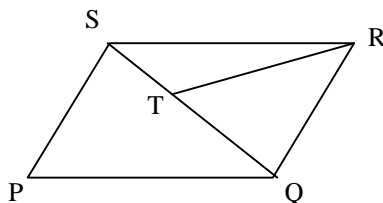


Diagram 3
Rajah 3

Given that $\overrightarrow{PQ} = 15\vec{p}$, $\overrightarrow{PS} = 10\vec{q}$ and $3\overrightarrow{ST} = 2\overrightarrow{TQ}$, express, in terms of \vec{p} and \vec{q} :

Diberi $\overrightarrow{PQ} = 15\vec{p}$, $\overrightarrow{PS} = 10\vec{q}$ dan $3\overrightarrow{ST} = 2\overrightarrow{TQ}$, ungkapkan, dalam sebutan \vec{p} dan \vec{q} :

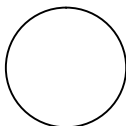
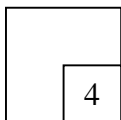
(a) \overrightarrow{QS} ,

(b) \overrightarrow{TR} .

[4 marks]

[4 markah]

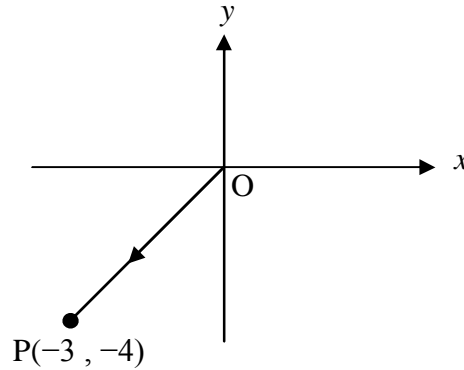
15



3472/1

Answer / Jawapan: (a) $\overrightarrow{QS} = \dots\dots\dots$

(b) $\overrightarrow{TR} = \dots\dots\dots$

SULIT**13****3472/1**For
Examiner's
Use**16** Diagram 4 shows vector \overrightarrow{OP} .*Rajah 4 menunjukkan vektor \overrightarrow{OP} .*Diagram 4
Rajah 4(a) Express \overrightarrow{OP} in the form $\begin{pmatrix} x \\ y \end{pmatrix}$,*Ungkapkan \overrightarrow{OP} dalam bentuk $\begin{pmatrix} x \\ y \end{pmatrix}$,*(b) Find the unit vector in the direction of \overrightarrow{OP} .*Cari vector unit dalam arah \overrightarrow{OP} .*

[3 marks]

[3 markah]

Answer / Jawapan: (a)

(b)

16

3

17 Given that $\cos x = t$ and $0^\circ \leq x \leq 90^\circ$, express, in terms of t :*Diberi bahawa $\cos x = t$ dan $0^\circ \leq x \leq 90^\circ$, ungkapkan, dalam sebutan t :*(a) $\sin x$ (b) $\tan(90^\circ - x)$

[3 marks]

[3 markah]

Answer / Jawapan: (a)

(b)

17

3

3472/1

For
Examiner's
Use

- 18 Diagram 5 shows a sector POQ of a circle with centre O and POR is a right-angle triangle.
Rajah 5 menunjukkan sektor POQ bagi sebuah bulatan berpusat O dan POR adalah segitiga bersudut tegak.

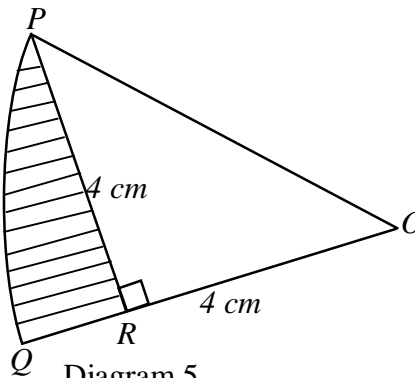


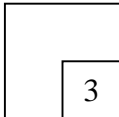
Diagram 5
Rajah 5

Given that $\angle ORP = 90^\circ$, $PR = OR = 4$ cm and ORQ is a straight line.
Diberi bahawa $\angle ORP = 90^\circ$, $PR = OR = 4$ cm dan ORQ adalah garis lurus.

Find the perimeter of the shaded region.
Cari perimeter bagi kawasan yang berlorek.

[3 marks]
[3 markah]

18



Answer / Jawapan:.....

- 19 The curve $y = f(x)$ is such that $\frac{dy}{dx} = \frac{1}{2}x + 1$. The gradient of the normal to the curve at $x = k$ is $\frac{1}{3}$, where k is a constant.

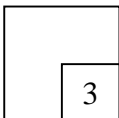
Find the value of k .

Suatu lengkung $y = f(x)$ adalah dengan keadaan $\frac{dy}{dx} = \frac{1}{2}x + 1$. Kecerunan normal lengkung itu di $x = k$ ialah $\frac{1}{3}$, di mana k ialah pemalar.

Cari nilai k .

[3 marks]
[3 markah]

19



Answer / Jawapan: $k = \dots\dots\dots$

SULIT**15****3472/1**For
Examiner's
Use

20 Given that $h(x) = \frac{3}{(2x-1)^3}$, evaluate $h'(1)$. [3 marks]

Diberi $h(x) = \frac{3}{(2x-1)^3}$, hitung nilai $h'(1)$. [3 markah]

20

Answer / Jawapan:

3

21 Given that $\int_2^k [4x+6] dx = -24$, where $k < 0$, find the values of k . [4 marks]

Diberi bahawa $\int_2^k [4x+6] dx = -24$, di mana $k < 0$, cari nilai-nilai k . [4 markah]

21

4

Answer / Jawapan: $k =$ [Lihat sebelah
SULIT

3472/1

For
Examiner's
Use

- 22 The numbers x_1, x_2, x_3, x_4, x_5 has interquartile range of 8 and variance of 25.
Nombor–nombor x_1, x_2, x_3, x_4, x_5 mempunyai julat antara kuartil 8 dan varians 25.

Determine

Tentukan

- (a) the new interquartile range, and
julat antara kuartil yang baru, dan
- (b) the new standard deviation, of the numbers :
sisihan piawai yang baru, untuk nombor–nombor :

$$\frac{1}{4}x_1 + 2, \frac{1}{4}x_2 + 2, \frac{1}{4}x_3 + 2, \frac{1}{4}x_4 + 2, \frac{1}{4}x_5 + 2 .$$

[3 marks]

[3 markah]

22

3

Answer / *Jawapan* : (a)

(b)

- 23 The probability that Siti qualifies for a college education is $\frac{2}{7}$ while the probability that Alex qualifies is $\frac{1}{3}$.

Kebarangkalian Siti layak memasuki sebuah kolej ialah $\frac{2}{7}$ manakala kebarangkalian

Alex layak ialah $\frac{1}{3}$.

Find the probability that

Cari kebarangkalian bahawa

- (a) both of them qualify for the college education,
kedua-duanya layak memasuki kolej,
- (b) only one of them qualifies for the college education.
hanya seorang daripada mereka layak memasuki kolej.

[3 marks]

[3 markah]

23

3

Answer / *Jawapan*:(a)

(b).....

- 24 In a survey, it is found that 30% of the population in a housing area are teenagers. If a sample of 10 people is selected at random, find the probability that 2 of them are teenagers.

[3 marks]

Dalam suatu tinjauan, didapati 30% daripada penduduk di suatu kawasan perumahan terdiri daripada remaja. Jika satu sample 10 orang dipilih secara rawak, cari kebarangkalian bahawa 2 orang daripadanya ialah remaja.

[3 markah]

Answer / Jawapan:

24

3

25

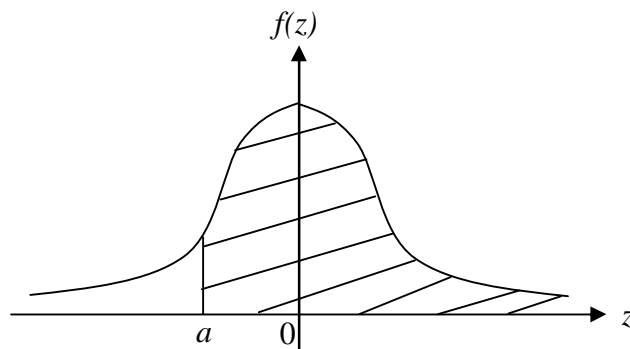


Diagram 6

Rajah 6

Diagram 6 shows a standard normal curve. Given that $P(Z > a) = 0.6103$.

Find the value of a .

Rajah 6 menunjukkan graf taburan normal. Diberi $P(Z > a) = 0.6103$.

Cari nilai a .

[2 marks]

[2 markah]

25

2

Answer/ Jawapan : $a =$

END OF QUESTION PAPER
KERTAS SOALAN TAMAT