

NO. KAD PENGENALAN

ANGKA GILIRAN

Nama Tingkatan

Sekolah

MODUL PINTAS 2019 TINGKATAN 5

3472/1

ADDITIONAL MATHEMATICS

Kertas 1

Ogos/September

2 jam

Dua jam

**JANGAN BUKA KERTAS PEPERIKSAAN INI
SEHINGGA DIBERITAHU**

1. *Tulis nombor kad pengenalan, angka giliran, nama, tingkatan dan sekolah anda pada petak yang disediakan.*
2. *Kertas peperiksaan ini adalah dalam dwibahasa.*
3. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.*
5. *Calon dikehendaki membaca maklumat di halaman belakang kertas peperiksaan ini.*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CALCULUS KALKULUS

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

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

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

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

$$5 \quad \text{Volume of revolution} \\ \text{Isi padu kisanan} \\ = \int_a^b \pi y^2 \, dx \text{ or (atau)} \\ = \int_a^b \pi x^2 \, dy$$

STATISTICS
STATISTIK

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

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

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

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

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

$$6 \quad I = \frac{Q_1}{Q_0} \times 100$$

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

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

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

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

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

$$12 \quad \text{Mean / Min} , \mu = np$$

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

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

GEOMETRY
GEOMETRI

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

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

$$3 \quad \text{A point dividing a segment of a line} \\ \text{Titik yang membahagi suatu tembereng garis} \\ (x, y) = \left(\frac{nx_1 + mx_2}{m+n}, \frac{ny_1 + my_2}{m+n} \right)$$

$$4 \quad \text{Area of triangle / Luas segi tiga} \\ = \frac{1}{2} |(x_1 y_2 + x_2 y_3 + x_3 y_1) - (x_2 y_1 + x_3 y_2 + x_1 y_3)|$$

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

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

TRIGONOMETRY
TRIGONOMETRI

- | | |
|---|--|
| <p>1 Arc length, $s = r \theta$
<i>Panjang lengkok, $s = j \theta$</i></p> | <p>8 $\sin (A \pm B) = \sin A \cos B \pm \cos A \sin B$
$\sin (A \pm B) = \sin A \text{ kos } B \pm \text{ kos } A \sin B$</p> |
| <p>2 Area of sector, $A = \frac{1}{2} r^2 \theta$
<i>Luas sektor, $L = \frac{1}{2} j^2 \theta$</i></p> | <p>9 $\cos (A \pm B) = \cos A \cos B \mp \sin A \sin B$
$\text{kos } (A \pm B) = \text{kos } A \text{ kos } B \mp \sin A \sin B$</p> |
| <p>3 $\sin^2 A + \cos^2 A = 1$
$\sin^2 A + \text{kos}^2 A = 1$</p> | <p>10 $\tan (A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$</p> |
| <p>4 $\sec^2 A = 1 + \tan^2 A$
$\text{sek}^2 A = 1 + \tan^2 A$</p> | <p>11 $\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$</p> |
| <p>5 $\text{cosec}^2 A = 1 + \cot^2 A$
$\text{kosek}^2 A = 1 + \text{kot}^2 A$</p> | <p>12 $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$</p> |
| <p>6 $\sin 2A = 2 \sin A \cos A$
$\sin 2A = 2 \sin A \text{ kos } A$</p> | <p>13 $a^2 = b^2 + c^2 - 2bc \cos A$
$a^2 = b^2 + c^2 - 2bc \text{ kos } A$</p> |
| <p>7 $\cos 2A = \cos^2 A - \sin^2 A$
$= 2 \cos^2 A - 1$
$= 1 - 2 \sin^2 A$

$\text{kos } 2A = \text{kos}^2 A - \sin^2 A$
$= 2 \text{ kos}^2 A - 1$
$= 1 - 2 \sin^2 A$</p> | <p>14 Area of triangle / <i>Luas segi tiga</i>
$= \frac{1}{2} ab \sin C$</p> |

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

- 1 A chairman, a secretary and 4 committee members of Science Society will be selected from 10 students that include a set of twins. If a student has been appointed as a chairman, find the number of ways 6 posts can be filled.

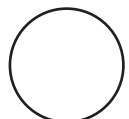
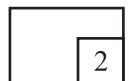
Seorang pengerusi, seorang setiausaha dan 4 ahli jawatankuasa Persatuan Sains akan dipilih daripada 10 orang pelajar termasuk sepasang kembar. Jika seorang pelajar telah dilantik sebagai pengerusi, cari bilangan cara 6 jawatankuasa itu dapat dibentuk.

[2 marks]

[2 markah]

Answer / Jawapan:

1



2 Diagram 2 shows the class for three students.

Rajah 2 menunjukkan kelas bagi tiga orang pelajar.

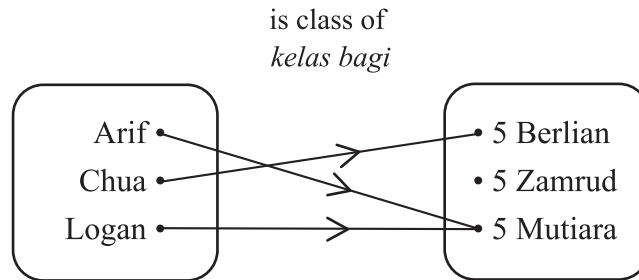


Diagram 2
Rajah 2

(a) State the range of the relation,

Nyatakan julat bagi hubungan itu,

(b) Determine whether the relation is a function.

Tentukan sama ada hubungan itu ialah suatu fungsi.

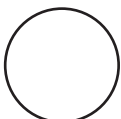
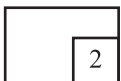
[2 marks]
[2 markah]

Answer / *Jawapan:*

(a)

(b)

2

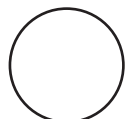
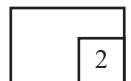


- 3 The point $P(4, 7)$ lies on the circumference of a circle with centre $T(-8, 2)$.
Find the radius of the circle. [2 marks]

*Titik $P(4, 7)$ terletak pada lilitan suatu bulatan dengan pusat $T(-8, 2)$.
Cari jejari bulatan itu.* [2 markah]

Answer / Jawapan:

3



For
Examiner's
Use

8

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4 Given $g : x \rightarrow |4x - 5|$
Diberi $g : x \rightarrow |4x - 5|$

Find

Cari

- (a) $g(-1)$,
- (b) the object of 3.
objek bagi 3.

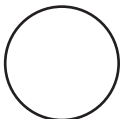
[3 marks]
[3 markah]

Answer / Jawapan:

(a)

(b)

4



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- 5 A group of student of class 5 Sains Tulen want to sponsor a banner for teacher's day 2019. Cost of the banner is RM60 and will be divided equally among them. Four students from class 5 Sains Iktisas also want to share sponsor the banner. Finally, each of them need to pay less RM0.50.

Determine total number of students that sponsor the banner. [3 marks]

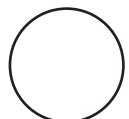
Sekumpulan pelajar daripada kelas 5 Sains Tulen bercadang menaja banner untuk sambutan hari guru 2019. Kos banner tersebut ialah RM60 dan akan dibahagikan sama rata oleh kumpulan pelajar itu. Empat orang pelajar daripada kelas 5 Sains Iktisas juga ingin berkongsi menaja banner itu. Akhirnya, setiap pelajar perlu membayar kurang RM0.50.

Tentukan jumlah bilangan pelajar yang berkongsi menaja banner tersebut.

[3 markah]

Answer / Jawapan:

5



- 6 (a) Express the quadratic equation which has roots $\frac{1}{3}$ and -3 in form of $ax^2 + bx + c = 0$ where a, b and c are constants. [2 marks]

Ungkapkan persamaan kuadratik yang mempunyai punca-punca $\frac{1}{3}$ dan -3 dalam bentuk $ax^2 + bx + c = 0$, dengan keadaan a, b dan c ialah pemalar.

[2 markah]

- (b) Find the range of values of m such that $m(m - 2) \geq m + 4$. [2 marks]

Cari julat bagi nilai m di mana $m(m - 2) \geq m + 4$. [2 markah]

Answer / Jawapan:

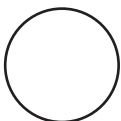
(a)

(b)

6



4



7 Given the quadratic function graph $f(x) = x^2 + 3x - 4$.

Diberi graf fungsi kuadratik $f(x) = x^2 + 3x - 4$.

(a) Express $f(x)$ in the form of $(x + b)^2 + c$, where b and c are constants,

Ungkapkan $f(x)$ dalam bentuk $(x + b)^2 + c$, dengan keadaan b dan c adalah pemalar;

(b) State

Nyatakan

(i) the equation of the axis of symmetry,
persamaan paksi simetri,

(ii) the coordinates of the minimum point.
koordinat titik minimum.

[4 marks]

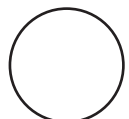
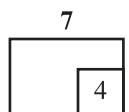
[4 markah]

Answer / Jawapan:

(a)

(b) (i)

(ii)



- 8 The trajectory of a boy throwing a shot put follows a quadratic function $y = f(x)$ for which y is the height of the shot put and x is the horizontal distance of the shot put. Given that $f(x) = a(x - p)^2 + q$, where the maximum trajectory is given by coordinates of (3, 3) and the shot put will end up by the coordinates of (8, 0).

Find the value of a , p and q . [3 marks]

Lontaran peluru oleh seorang budak lelaki menghasilkan fungsi kuadratik $y = f(x)$ dengan keadaan y ialah ketinggian peluru dan x ialah jarak mengufuk peluru tersebut. Diberi bahawa $f(x) = a(x - p)^2 + q$, dengan keadaan lontaran maksimum peluru berkoordinat (3, 3) dan lontaran itu akan berakhir pada koordinat (8, 0).

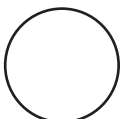
Cari nilai a , p dan q . [3 markah]

Answer / Jawapan:

8



3



- 9 After n years, price for a car bought is $\text{RM}60\,000 \left(\frac{7}{8}\right)^n$.

Calculate the number of years it takes for the price of the car less than $\text{RM}20\,000$ for the first time. [4 marks]

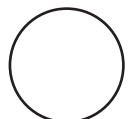
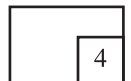
Selepas n tahun dibeli, harga sebuah kereta ialah $\text{RM}60\,000 \left(\frac{7}{8}\right)^n$.

Hitungkan selepas berapa tahunkah kereta itu berharga kurang daripada $\text{RM}20\,000$ buat kali pertama.

[4 markah]

Answer / Jawapan:

9



For
Examiner's
Use

14

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- 10 Solve the equation:
Selesaikan persamaan:

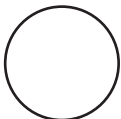
$$\sqrt{8^{x+4}} = \frac{1}{4^x 2^{x+3}}$$

[3 marks]
[3 markah]

Answer / *Jawapan:*

10

3



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- 11 Adam's monthly saving form an arithmetic progression $m - 3$, $m + 4$ and $2m + 3$.
Tabungan bulanan Adam membentuk suatu jangjang aritmetik $m - 3$, $m + 4$ dan $2m + 3$.

Find
Cari

- (a) the value of m ,
nilai bagi m ,
- (b) the sum of Adam's saving at first quarter of the year.
jumlah tabungan Adam pada suku tahun pertama.

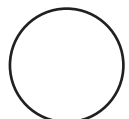
[4 marks]
[4 markah]

Answer / *Jawapan:*

(a)

(b)

11



- 12 In a geometric progression, the first term is a , and the common ratio is r .
Given the fourth term of the progression exceeds the second term by $-\frac{128}{9}$.
The sum of the first two terms is 64, where $r < \frac{1}{2}$.

Find the value of a and of r . [4 marks]

Dalam suatu jangjang geometri, sebutan pertama ialah a dan nisbah sepunya ialah r .

Diberi sebutan keempat jangjang itu melebihi sebutan kedua sebanyak $-\frac{128}{9}$.

Hasil tambah sebutan pertama dan kedua ialah 64, dengan keadaan $r < \frac{1}{2}$.

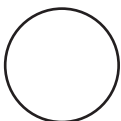
Cari nilai a dan nilai r . [4 markah]

Answer / Jawapan:

12



4



- 13 The variables x and y are related by the equation $y = px + qx^{\frac{3}{2}}$, where p and q are constants. Diagram 13 shows a straight line graph obtain by plotting $\frac{y}{x}$ against \sqrt{x} .

Pemboleh ubah x dan y dihubungkan oleh persamaan $y = px + qx^{\frac{3}{2}}$, dengan keadaan p dan q ialah pemalar. Rajah 13 menunjukkan suatu graf garis lurus diperolehi dengan memplotkan $\frac{y}{x}$ melawan \sqrt{x} .

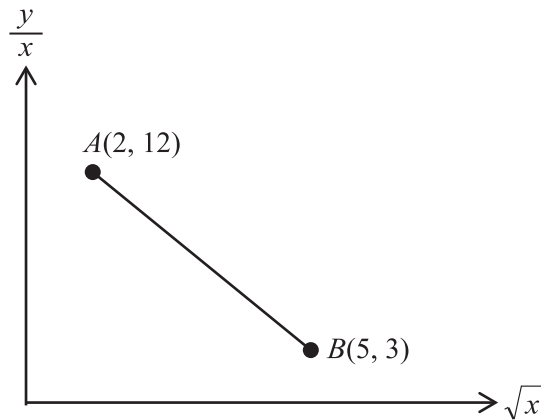


Diagram 13
Rajah 13

Find the value of p and of q .

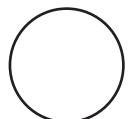
[3 marks]

Cari nilai p dan nilai q .

[3 markah]

Answer / Jawapan:

13



- 14 Diagram 14 shows a sector OPQ with centre O .
Rajah 14 menunjukkan sebuah sektor OPQ dengan pusat O .

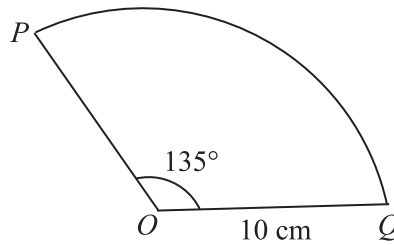


Diagram 14
Rajah 14

[Use / *Guna*, $\pi = 3 \cdot 142$]

Find
Cari

- (a) $\angle POQ$, in terms of π radians,
 $\angle POQ$, dalam sebutan π radians,
- (b) the perimeter, in cm, of the sector OPQ .
perimeter, dalam cm, sektor OPQ .

[3 marks]
[3 markah]

Answer / *Jawapan* :

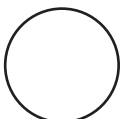
(a)

(b)

14



3



- 15 Given that $\sin \alpha = \frac{5}{13}$ and $\cos \beta = \frac{4}{5}$, where α is an obtuse angle and β is an acute angle.

Diberi bahawa $\sin \alpha = \frac{5}{13}$ dan $\cos \beta = \frac{4}{5}$, dengan keadaan α ialah sudut cakah dan β ialah sudut tirus.

Find

Cari

- (a) $\cos \alpha$,
kos α ,
- (b) $\sin(\alpha - \beta)$.

[3 marks]

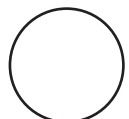
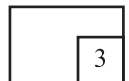
[3 markah]

Answer / *Jawapan:*

(a)

(b)

15



- 16 The area price of a land in Shah Alam district is RM2 500 / m². Ah Meng spends RM120 000 to buy the area by positions $A(1, 2)$, $B(4, 8)$ and $C(p, 6)$.

Calculate the values of p .

[3 marks]

Harga keluasan sebidang tanah di daerah Shah Alam ialah RM2 500 / m². Ah Meng membelanjakan RM120 000 untuk membeli kawasan yang dibatasi oleh kedudukan $A(1, 2)$, $B(4, 8)$ dan $C(p, 6)$.

Hitungkan nilai-nilai p .

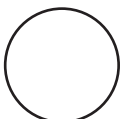
[3 markah]

Answer / Jawapan:

16



3



- 17 Given $\mathbf{v} = 2\mathbf{i} + 3\mathbf{j}$ and $\mathbf{w} = -2\mathbf{i} + \mathbf{j}$. Coordinates of P is $(3, -3)$ and Q is $(9, 2)$.
If $\overrightarrow{PQ} = h\mathbf{v} + k\mathbf{w}$ where h and k are constants.

Find the value of h and of k .

[4 marks]

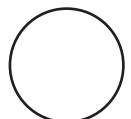
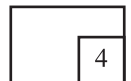
Diberi $\mathbf{v} = 2\mathbf{i} + 3\mathbf{j}$ dan $\mathbf{w} = -2\mathbf{i} + \mathbf{j}$. Koordinat P ialah $(3, -3)$ dan Q ialah $(9, 2)$. Jika $\overrightarrow{PQ} = h\mathbf{v} + k\mathbf{w}$ dengan keadaan h dan k ialah pemalar.

Cari nilai h dan nilai k .

[4 markah]

Answer / Jawapan:

17



- 18 Given that $A(4, 6)$ and $\overrightarrow{PA} = 3\mathbf{i} - 11\mathbf{j}$.
Diberi bahawa $A(4, 6)$ dan $\overrightarrow{PA} = 3\mathbf{i} - 11\mathbf{j}$.

Find

Cari

(a) \overrightarrow{OA}

[1 mark]

[1 markah]

- (b) the coordinate of P .
koordinat P .

[2 marks]

[2 markah]

Answer / *Jawapan:*

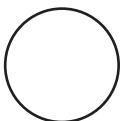
(a)

(b)

18



3



- 19 Diagram 19 shows the air bubble in the form of sphere is released from a balloon at the rate of $16\pi \text{ cm}^3 \text{ s}^{-1}$.

Rajah 19 menunjukkan bocoran udara daripada sebiji belon yang berbentuk sfera dengan kadar $16\pi \text{ cm}^3 \text{ s}^{-1}$.

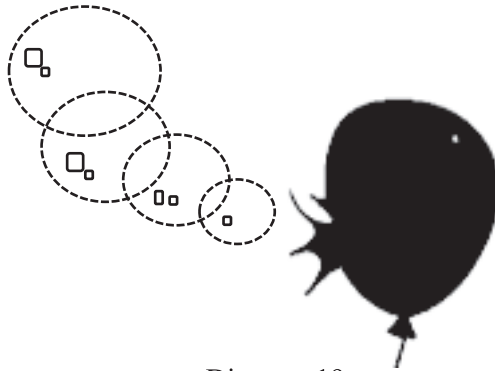


Diagram 19
Rajah 19

Find the rate of change of the radius, in cm s^{-1} , of the balloon when the volume of the balloon is $\frac{32}{3}\pi \text{ cm}^3$.

Cari kadar perubahan jejari, dalam cm s^{-1} , belon itu apabila isi padu belon ialah $\frac{32}{3}\pi \text{ cm}^3$.

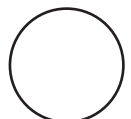
$$[\text{Volume of sphere} = \frac{4}{3}\pi r^3 / \text{Isi padu sfera} = \frac{4}{3}\pi j^3]$$

[3 marks]

[3 markah]

Answer / Jawapan:

19



For
Examiner's
Use

24

3472/1

20 Given $y = 4x^3 - 5x + 7$, find the value of $x \frac{d^2y}{dx^2} - 2 \frac{dy}{dx} - 10$.

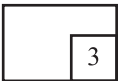
[3 marks]

Diberi $y = 4x^3 - 5x + 7$, cari nilai bagi $x \frac{d^2y}{dx^2} - 2 \frac{dy}{dx} - 10$.

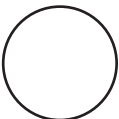
[3 markah]

Answer / Jawapan:

20



3



3472/1

21 Given $\int_2^5 h(x) dx = 6$, find the value of

Diberi $\int_2^5 h(x) dx = 6$, cari nilai

(a) $\int_5^2 3h(x) dx$,

(b) $\int_2^5 [4 - h(x)] dx$.

[3 marks]

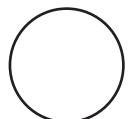
[3 markah]

Answer / Jawapan:

(a)

(b)

21



For
Examiner's
Use

22 An integer set consists 3, r and 8. The variance for this integer set is $\frac{38}{9}$.

Find the value r .

Satu set integer terdiri daripada 3, r dan 8. Varians bagi set integer ini ialah $\frac{38}{9}$.

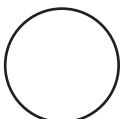
Cari nilai r .

[3 marks]

[3 markah]

Answer / Jawapan:

22



- 23 Table 23 shows the marks for 30 students in a monthly exam that consists 26 questions.

Jadual 23 menunjukkan markah bagi 30 orang pelajar di dalam ujian bulanan yang mengandungi 26 soalan.

Score Skor	4 – 9	10 – 15	16 – 21	22 – 27
Frequency Kekerapan	6	q	m	6

Table 23
Jadual 23

Given that the median for the data is 16.41. Express q in terms of m .

Hence, if $q = 7$, find the value of first quartile.

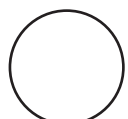
[4 marks]

Diberi bahawa nilai median adalah 16.41. Ungkapkan q dalam sebutan m .

Seterusnya, jika $q = 7$, cari nilai bagi kuartil pertama.

[4 markah]

Answer / Jawapan:



- 24 Table 24 shows the number of local fruits purchased by Steven. He bought two types of local fruits, durian and mangoesteen.

Jadual 24 menunjukkan bilangan buah-buahan tempatan yang telah dibeli oleh Steven. Dia membeli dua jenis buah-buahan tempatan iaitu durian dan manggis.

Types of fruits <i>Jenis buah-buahan</i>	Number of fruits <i>Bilangan buah-buahan</i>	
	Good <i>Baik</i>	Rotten <i>Rosak</i>
Durian <i>Durian</i>	9	3
Mangoesteen <i>Manggis</i>	5	4

Table 24
Jadual 24

The probability Steven get a good mangoesteen is $\frac{4}{5}$.

Find the probability Steven get a rotten local fruits. [4 marks]

Kebarangkalian Steven mendapatkan buah manggis yang elok ialah $\frac{4}{5}$.

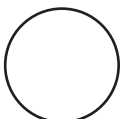
Cari kebarangkalian untuk Steven mendapatkan buah-buahan tempatan yang rosak. [4 markah]

Answer / Jawapan:

24



4



- 25 The height of a tree in Kampung Sepakat agricultural area has a normal distribution with the mean of 175 cm and standard deviation of 15 cm.

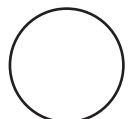
Find the percentage of tree that have an altitude of more than 185 cm. [3 marks]

Ketinggian sebatang pokok di kawasan pertanian Kampung Sepakat mempunyai taburan normal dengan min 175 cm dan sisihan piawai 15 cm.

Cari peratus pokok yang mempunyai ketinggian lebih daripada 185 cm. [3 markah]

Answer / Jawapan:

25



END OF QUESTION PAPER
KERTAS PEPERIKSAAN TAMAT

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HALAMAN KOSONG

**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									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

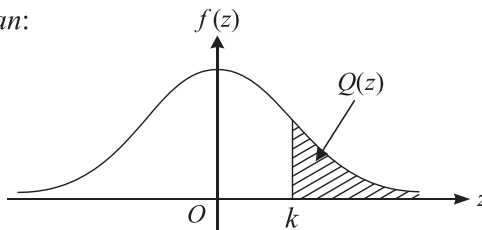
For negative z use relation:

Bagi z negatif guna hubungan:

$$Q(z) = 1 - Q(-z) = P(-z)$$

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

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



Example / Contoh:

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

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

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

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

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of **25** questions.
*Kertas soalan ini mengandungi **25** soalan.*
2. Answer **all** questions.
*Jawab **semua** soalan.*
3. Write your answers in the spaces provided in the question paper.
Tulis jawapan anda dalam ruang yang disediakan dalam kertas peperiksaan.
4. Show your working. It may help you to get marks.
Tunjukkan langkah-langkah penting dalam kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.
5. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.
Sekiranya anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baharu.
6. The diagrams in the questions provided are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
7. The marks allocated for each question are shown in brackets.
Markah yang diperuntukkan bagi setiap soalan ditunjukkan dalam kurungan.
8. A list of formulae is provided on page **2** to **4**.
*Satu senarai rumus disediakan di halaman **2** hingga **4**.*
9. The Upper Tail Probability $Q(z)$ For The Normal Distribution $N(0, 1)$ Table is provided on page **31**.
*Jadual Kebarangkalian Hujung Atas $Q(z)$ Bagi Taburan Normal $N(0, 1)$ disediakan di halaman **31**.*
10. You may use a scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik.
11. Hand in this question paper to the invigilator at the end of the examination.
Serahkan kertas peperiksaan ini kepada pengawas peperiksaan di akhir peperiksaan.