

3472/1  
 Tingkatan 5  
 Additional Mathematics  
 Kertas 1  
 Ogos  
 2 jam

NAMA : \_\_\_\_\_

KELAS : \_\_\_\_\_

ANGKA GILIRAN: \_\_\_\_\_

NO KP: \_\_\_\_\_

## PENILAIAN PERCUBAAN SPM NEGERI PAHANG 2017

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**ADDITIONAL MATHEMATICS**  
**Kertas 1**  
**2 Jam**

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**JANGAN BUKA KERTAS SOALAN INI  
 SEHINGGA DIBERITAHU**

1. *Tulis nombor kad pengenalan dan angka giliran anda dalam ruang yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan dalam bahasa Inggeris medahului 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 soalan ini.*

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

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Kertas soalan ini mengandungi **28** halaman bercetak.

## 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 Area under a curve

*Luas di bawah lengkung*

$$= \int_a^b y \, dx \quad \text{or (atau)}$$

$$= \int_a^b x \, dy$$

5 Volume generated

*Isipadu kisanan*

$$= \int_a^b \pi y^2 \, dx \quad \text{or (atau)}$$

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

**STATISTICS**  
**STATISTIK**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**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 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 segi tiga

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

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

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

**TRIGONOMETRY**  
**TRIGONOMETRI**

1 Arc length,  $s = r\theta$   
Panjang lengkok,  $s = j\theta$

2 Area of a sector,  $A = \frac{1}{2}r^2\theta$   
Luas sektor,  $L = \frac{1}{2}j^2\theta$

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

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

5  $\operatorname{cosec}^2 A = 1 + \cot^2 A$   
 $\operatorname{kosek}^2 A = 1 + \operatorname{kot}^2 A$

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

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

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

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

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

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

14 Area of triangle/Luas segi tiga  
 $= \frac{1}{2}ab \sin C$

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

- 1 Diagram 1 shows the graph of a quadratic function  $f(x) = x^2 + (n - 1)x + 6$ , where  $n$  is a constant.  
Rajah 1 menunjukkan graf fungsi kuadratik  $f(x) = x^2 + (n - 1)x + 6$ , dengan keadaan  $n$  ialah pemalar.

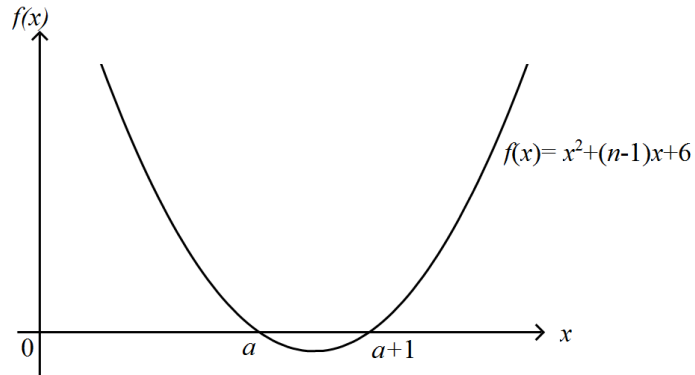


Diagram 1  
Rajah 1

Find  
Cari

- (a) the roots of the quadratic equation  $x^2 + (n - 1)x + 6 = 0$ .  
punca-punca bagi persamaan kuadratik  $x^2 + (n - 1)x + 6 = 0$ .  
(b) the value of  $n$ .  
nilai  $n$ .

[3 marks]  
[3 markah]

Answer/Jawapan:

(a)

(b)

<b>1</b>
3

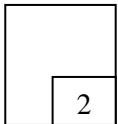
- 2 Syed threw a ball such that the height,  $s$  m, of the ball from the ground at time  $t$  seconds is given by the equation  $s = -4.9t^2 + 18t + 1.5$ .  
*Syed melontar sebiji bola dengan ketinggian bola,  $s$  m dari tanah selepas  $t$  saat adalah diberi oleh persamaan  $s = -4.9t^2 + 18t + 1.5$ .*

Determine whether the ball could reach a height of 15 m from the ground. Justify your answer. [2 marks]

*Tentukan sama ada bola tersebut boleh mencapai ketinggian 15 m dari tanah. Berikan justifikasi jawapan anda.* [2 markah]

Answer/Jawapan:

2



- 3 The third, fourth and fifth term of a geometric progression are  $x^2 + 1$ ,  $5x$  and 20 where  $x > 0$ .  
*Sebutan ketiga, keempat dan kelima suatu janjang geometri ialah  $x^2 + 1$ ,  $5x$  dan 20 dengan keadaan  $x > 0$ .*

Find/Cari

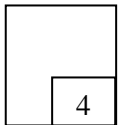
- (a) the value of  $x$ ,  
*nilai  $x$ ,*  
 (b) the eighth term of the geometric progression.  
*sebutan kelapan janjang geometri ini.*

[4 marks]  
 [4 markah]

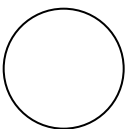
Answer/Jawapan:

(a)

3



(b)



- 4 The first three terms of an arithmetic progression are  $15$ ,  $13\frac{1}{2}$ ,  $12$ .  
*Tiga sebutan pertama suatu jangjang aritmetik ialah  $15$ ,  $13\frac{1}{2}$ ,  $12$ .*

Find  
*Cari*

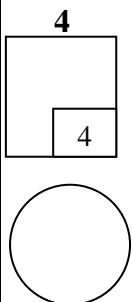
- (a) the first negative term,  
*sebutan negatif yang pertama,*
- (b) the sum of all the positive terms,  
*hasil tambah semua sebutan positif,*
- of this arithmetic progression.  
*jangjang aritmetik ini.*

Answer/Jawapan:

[4 marks]  
[4 markah]

(a)

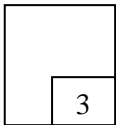
(b)



- 5 Given that the third, fifth and the eighth term of an arithmetic progression are the three consecutive terms of a geometric progression. Find the common ratio of the geometric progression. [3 marks]  
*Diberi bahawa sebutan ketiga, kelima dan kelapan suatu jangjang aritmetik ialah tiga sebutan berturutan bagi suatu jangjang geometri. Cari nisbah sepunya jangjang geometri itu.* [3 markah]

Answer /Jawapan:

5

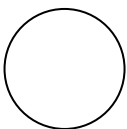
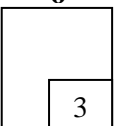


- 6 Given that  $f(x) = (x - 5)\sqrt{2x + 5}$  and  $f'(x) = \frac{kx}{\sqrt{2x+5}}$  where  $k$  is a constant. Find the value of  $k$ . [3 marks]

*Diberi  $f(x) = (x - 5)\sqrt{2x + 5}$  dan  $f'(x) = \frac{kx}{\sqrt{2x+5}}$  dengan keadaan  $k$  ialah pemalar. Cari nilai  $k$ .* [3 markah]

Answer /Jawapan:

6





- 7 Diagram 7 shows a circular ripple spreads across a pool.  
*Rajah 7 menunjukkan suatu riak bulatan merebak secara menyeluruh di sebuah kolam.*



Diagram 7  
*Rajah 7*

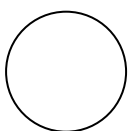
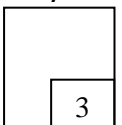
Given that the area of the ripple is increasing at a rate of  $12\pi \text{ m}^2 \text{ s}^{-1}$ . Find the rate of change of the radius of the ripple at the instant when the area of the ripple is  $4\pi \text{ m}^2$ .  
[3 marks]

*Diberi bahawa luas riak bertambah dengan kadar  $12\pi \text{ m}^2 \text{ s}^{-1}$ . Cari kadar perubahan jejari riak pada ketika luas riak ialah  $4\pi \text{ m}^2$ .*

[3 markah]

Answer/Jawapan:

7



- 8 Diagram 8 shows a major segment of a circular manhole cover with centre  $O$  and radius of 30 cm.  
*Rajah 8 menunjukkan tembereng major bagi suatu penutup lurang bulatan berpusat  $O$  dan berjajari 30 cm.*

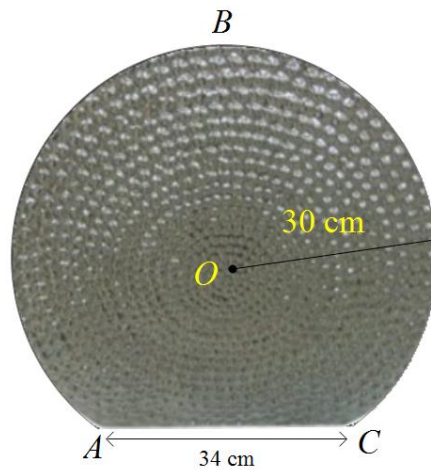


Diagram 8  
*Rajah 8*

Given that the cover is hinged at chord  $AC$  which is 34 cm in length.  
*Diberi penutup tersebut diengsel pada perentas  $AC$  yang panjangnya 34 cm.*

Use/Guna  $\pi = 3.142$

Find/ Cari

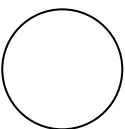
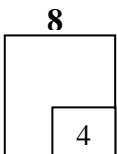
- the length, in cm, of the arc  $ABC$ ,  
*panjang, dalam cm, lengkok  $ABC$ ,*
- the surface area, in  $\text{cm}^2$ , of the manhole cover.  
*luas permukaan, dalam  $\text{cm}^2$ , penutup lurang itu.*

[4 marks]  
 [4 markah]

Answer/Jawapan:

(a)

(b)



- 9 Diagram 9 shows the graph of a quadratic function  $f(x) = p(x + \frac{q}{3})^2 + \frac{r}{2}$  where  $p$ ,  $q$  and  $r$  are constants.

Rajah 9 menunjukkan graf fungsi  $f(x) = p(x + \frac{q}{3})^2 + \frac{r}{2}$  dengan keadaan  $p$ ,  $q$  dan  $r$  ialah pemalar,

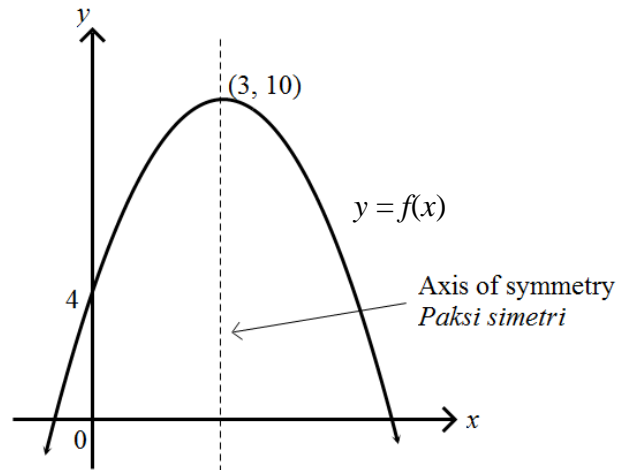


Diagram 9  
Rajah 9

State  
Nyatakan

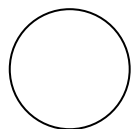
- the range of value  $p$ ,  
julat nilai  $p$ ,
- the value of  $q$ ,  
nilai  $q$ ,
- the value of  $r$ .  
nilai  $r$ .

[3 marks]  
[3 markah]

Answer/Jawapan:

- 
- 
- 

9
3



- 10** Diagram 10 shows part of the graph of a straight line obtained by plotting  $y\sqrt{x}$  against  $x$  for the positive values of variable  $x$  and  $y$ .  
*Rajah 10 menunjukkan sebahagian daripada graf garis lurus yang diperolehi dengan memplotkan  $y\sqrt{x}$  melawan  $x$  untuk nilai-nilai positif bagi pemboleh ubah-pemboleh ubah  $x$  dan  $y$ .*

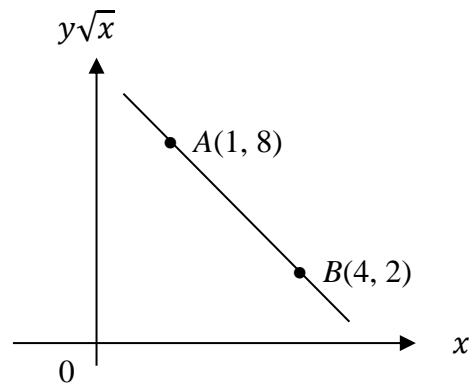


Diagram 10  
*Rajah 10*

- (a) Find  $y$  in terms of  $x$ ,  
*Cari  $y$  dalam sebutan  $x$ ,*
- (b) Given point  $C(9, -8)$  lies on the graph of  $y\sqrt{x}$  against  $x$ , find the value of  $y$  corresponding to the point  $C$ .  
*Diberi titik  $C(9, -8)$  terletak pada graf  $y\sqrt{x}$  melawan  $x$ , cari nilai  $y$  yang sepadan pada titik  $C$ .*

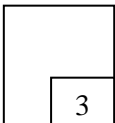
[3 marks]  
 [3 markah]

Answer/Jawapan:

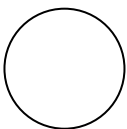
(a)

(b)

10



3



- 11 Diagram 11 shows a kite  $ABCD$  where vertex  $B$  lies on the  $x$ -axis.  
*Rajah 11 menunjukkan satu layang-layang  $ABCD$  yang mana bucu  $B$  berada pada paksi- $x$ .*

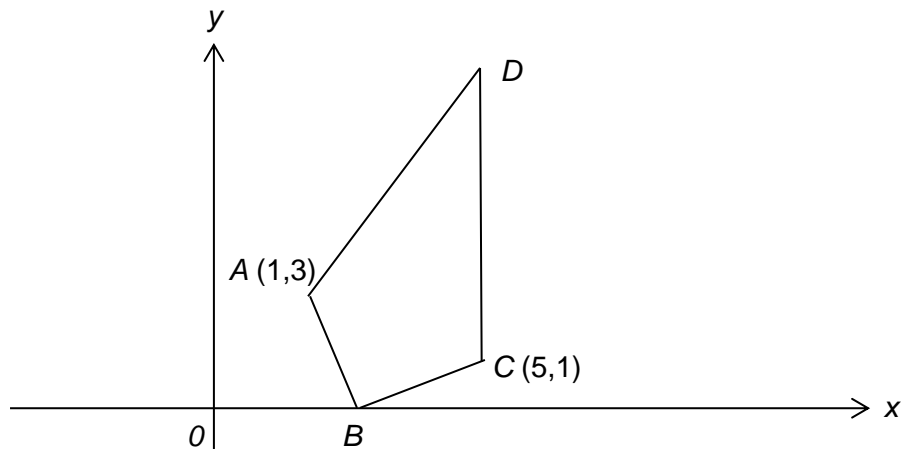


Diagram 11  
*Rajah 11*

Given  $CD$  is a vertical line and  $M$  is the midpoint of  $AC$ , find  
*Diberi  $CD$  ialah satu garis mencancang dan  $M$  ialah titik tengah  $AC$ , cari*

- coordinates of  $M$ ,  
*koordinat  $M$ ,*
- equation of straight line  $BD$ ,  
*persamaan garis lurus  $BD$ ,*
- ratio of  $BM : MD$   
*nisbah  $BM : MD$*

[4 marks]  
 [4 markah]

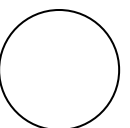
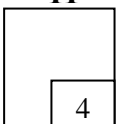
Answer/Jawapan:

(a)

(b)

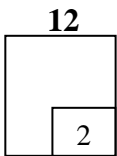
(c)

11



- 12** A point  $P$  moves such that its distance from the point  $(1,2)$  is twice its distance from the  $x$ -axis. Find the equation of the locus  $P$ . [2 marks]  
 Satu titik  $P$  bergerak dengan keadaan jaraknya daripada titik  $(1,2)$  adalah dua kali ganda jaraknya daripada paksi- $x$ . Cari persamaan lokus  $P$ . [2 markah]

Answer/Jawapan :



- 13** Given that  $\cos 25^\circ = p$ , without using calculator, find in terms of  $p$ ,  
 Diberi  $\cos 25^\circ = p$ , tanpa menggunakan kalkulator, cari dalam sebutan  $p$ ,

(a)  $\sin 65^\circ$  ,

(b)  $\cos (-25^\circ) + 1$   
 $\cos (-25^\circ) + 1$

(c)  $\sin (55^\circ)$

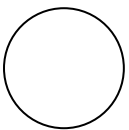
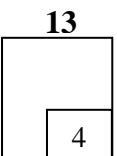
[ 4 marks]  
 [4 markah]

Answer/Jawapan :

(a)

(b)

(c)



- 14 Diagram 14 shows the shaded region bounded by the curve  $y = \frac{8}{x}$ , the x-axis, the y-axis,  $x = 4$  and  $y = 4$ .

Rajah 14 menunjukkan rantau berlorek yang dibatasi oleh lengkung  $y = \frac{8}{x}$ , paksi-x, paksi-y,  $x = 4$  dan  $y = 4$ .

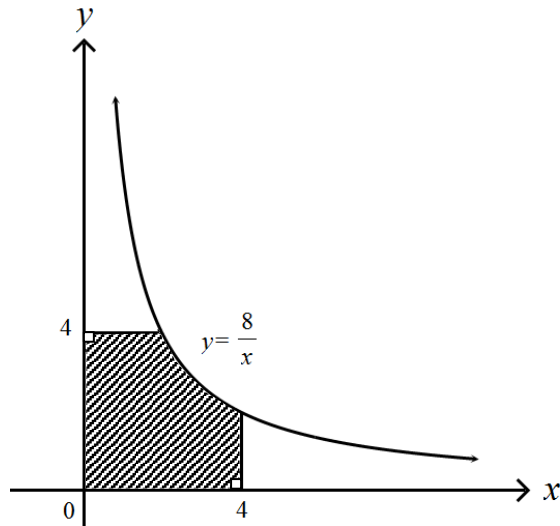


Diagram 14

Rajah 14

It is given that the area of the shaded region is  $13.55 \text{ unit}^2$ . Find  
Diberi bahawa luas rantau berlorek ialah  $13.55 \text{ unit}^2$ . Cari

(a)  $\int_2^4 \frac{8}{x} dx$

(b) the value of  $a$  when  $\int_a^{a+2} 4 dy + \int_2^4 \frac{8}{y} dy = 13.55 \text{ unit}^2$ .

nilai  $a$  apabila  $\int_a^{a+2} 4 dy + \int_2^4 \frac{8}{y} dy = 13.55 \text{ unit}^2$ .

[2 marks]  
[2 markah]

Answer/Jawapan:

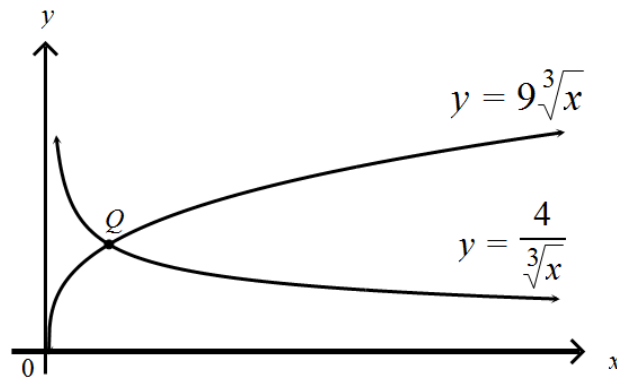
(a)

(b)

14

2

- 15 Diagram 15 shows the curve  $y = 9\sqrt[3]{x}$  and the curve  $y = \frac{4}{\sqrt[3]{x}}$  intersecting at point Q.  
 Rajah 15 menunjukkan lengkung  $y = 9\sqrt[3]{x}$  dan lengkung  $y = \frac{4}{\sqrt[3]{x}}$  menyilang pada titik Q.



- (a) State the number of solutions to the equation  $9\sqrt[3]{x} = \frac{4}{\sqrt[3]{x}}$ .  
 Nyatakan bilangan penyelesaian bagi persamaan  $9\sqrt[3]{x} = \frac{4}{\sqrt[3]{x}}$ .
- (b) Find the coordinates of Q.  
 Cari koordinat Q.

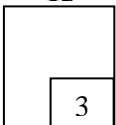
[3 marks]  
 [3 markah]

Answer/Jawapan:

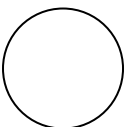
(a)

(b)

15



3





**16** Given that  $4 \log_{10} x\sqrt{y} = 1.5 + \log_{10}x - \log_{10}y$ , where  $x$  and  $y$  are both positive.

*Diberi  $4 \log_{10} x\sqrt{y} = 1.5 + \log_{10}x - \log_{10}y$ , dengan keadaan  $x$  dan  $y$  adalah positif.*

(a) Express in its simplest form,  $y$  in terms of  $x$ .

*Ungkapkan dalam bentuk termudah,  $y$  dalam sebutan  $x$ .*

(b) Find the value of  $y$  when  $x = \sqrt{40}$ .

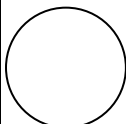
*Cari nilai  $y$  apabila  $x = \sqrt{40}$ .*

[4 marks]  
[4 markah]

Answer/Jawapan:

**16**

4



17 Diagram 17 in the answer space shows the vectors  $\underline{a}$  and  $\underline{b}$  draw on a grid of equal squares with sides of 1 unit.

Rajah 17 di ruang jawapan menunjukkan vektor  $\underline{a}$  dan  $\underline{b}$  dilukis pada grid segi empat sama yang sama besar bersisi 1 unit.

(a) In the answer space in part (a) , draw the vector  $\overrightarrow{RS}$  where  $\overrightarrow{RS} = 2\underline{a} - \underline{b}$  .

Di ruang jawapan bahagian (a), lukis vektor  $\overrightarrow{RS}$  dengan keadaan  $\overrightarrow{RS} = 2\underline{a} - \underline{b}$  .

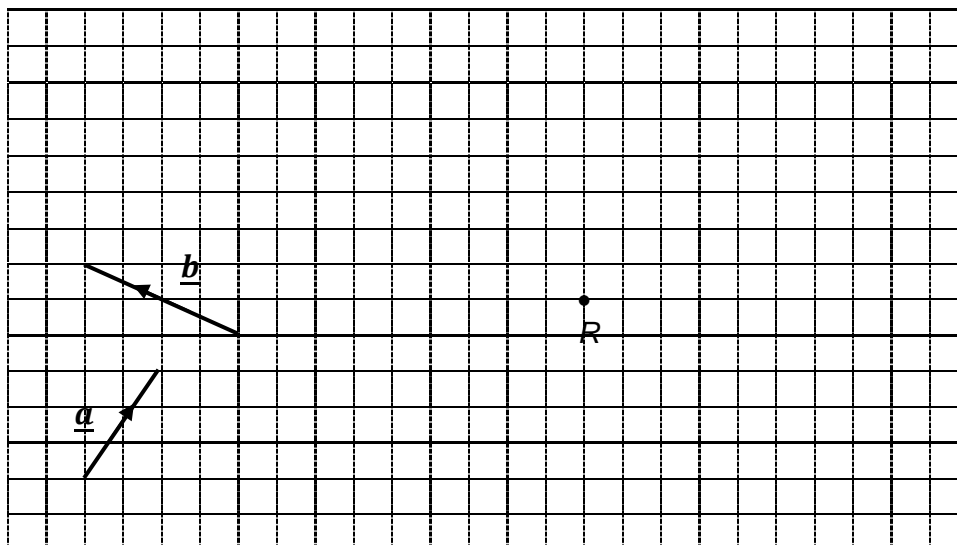
(b) Find  $|\overrightarrow{RS}|$  .

Cari  $|\overrightarrow{RS}|$  .

[2 marks]  
[2 markah]

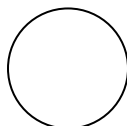
Answer/Jawapan

(a)



(b)

17  
2



- 18 Diagram 18 shows a triangle  $ABC$  and  $D$  is a point on  $AC$ .  
*Rajah 18 menunjukkan segi tiga  $ABC$  dan  $D$  ialah satu titik pada  $AC$ .*

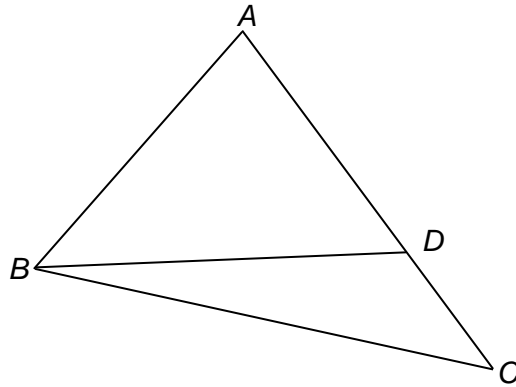


Diagram 18  
*Rajah 18*

Given that  $\overrightarrow{BA} = 3\mathbf{a}$ ,  $\overrightarrow{BC} = 5\mathbf{b}$  and  $3AD = 5 DC$ , find  
*Diberi  $\overrightarrow{BA} = 3\mathbf{a}$ ,  $\overrightarrow{BC} = 5\mathbf{b}$  dan  $3AD = 5 DC$ , cari*

(a)  $\overrightarrow{AC}$

(b)  $\overrightarrow{BD}$

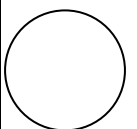
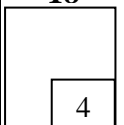
[4 marks]  
 [4 markah]

Answer/Jawapan:

(a)

(b)

18



- 19** In a survey conducted by a school, it is found that  $k\%$  of the teachers own a tablet computer. Table 19 shows part of the binomial distribution of  $X$  when a sample of four teachers were selected at random.  $X$  is a binomial random variable representing the teachers who own a tablet computer.

*Dalam satu kajian yang dikendalikan oleh sebuah sekolah, didapati  $k\%$  guru memiliki sebuah komputer tablet. Jadual 19 menunjukkan sebahagian taburan binomial  $X$  apabila satu sampel empat orang guru dipilih secara rawak.  $X$  merupakan pemboleh ubah rawak binomial yang mewakili guru yang memiliki komputer tablet.*

$X$	0	1
$P(X=x)$	0.0081	0.0756

Table 19  
Jadual 19

Find  
Cari

- (a) the value of  $k$ ,  
nilai  $k$ ,
- (b)  $P(X \geq 2)$

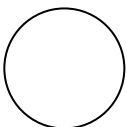
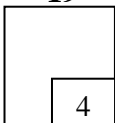
[4 marks]  
[4 markah]

Answer/Jawapan :

(a)

(b)

**19**



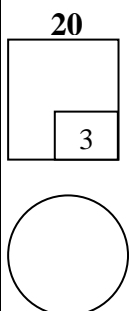
- 20** It is given that the marks of the 500 candidates in a Mathematics test have a normal distribution with a mean of 45 marks and a standard deviation of 20 marks.  
*Diberi bahawa markah untuk 500 calon dalam satu ujian Matematik mempunyai taburan normal dengan min 45 markah dan sisihan piawai 20 markah.*

Find the range of marks for those candidates who are in the middle 50% of the score.  
Give your answers correct to two decimal places.

*Cari julat nilai markah bagi calon-calon yang berada dalam lingkungan 50% di tengah skor. Beri jawapan anda betul kepada dua tempat perpuluhan.*

[3 marks]  
[3 markah]

Answer/Jawapan:



- 21 Diagram 21 shows the relation between set  $P$  and set  $Q$  in the arrow diagram form.  
*Rajah 21 menunjukkan hubungan antara set  $P$  dan set  $Q$  dalam bentuk rajah anak panah.*

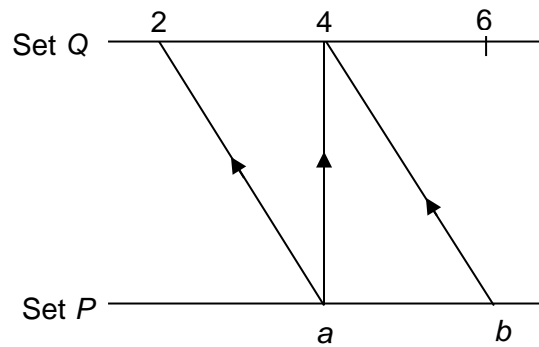


Diagram 21  
*Rajah 21*

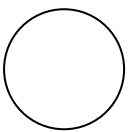
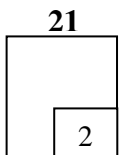
- (a) Represent the relation in the form of ordered pairs.  
*Wakilkkan hubungan itu dalam bentuk pasangan bertertib.*
- (b) State the codomain of the relation.  
*Nyatakan kodomain hubungan itu.*

[2 marks]  
 [2 markah]

Answer/Jawapan :

(a)

(b)



- 22 Given that function  $f(x) = x - 3$  and  $g(x) = \sqrt{x}$ ,  $x \geq 0$ .  
Diberi fungsi  $f(x) = x - 3$  dan  $g(x) = \sqrt{x}$ ,  $x \geq 0$ .

(a) Find the value of  $k$  such that  $fg(k) = 6$ .  
Cari nilai  $k$  dengan keadaan  $fg(k) = 6$ .

(b) Given function  $h$  maps  $x \rightarrow \sqrt{x - 3}$ ,  $x \geq 3$ . Express  $h$  in terms of  $f$  and  $g$ .  
Diberi fungsi  $h$  memetakan  $x \rightarrow \sqrt{x - 3}$ ,  $x \geq 3$ . Ungkapkan  $h$  dalam sebutan  $f$  dan  $g$ .

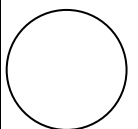
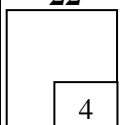
[4 marks]  
[4 markah]

Answer/Jawapan:

(a)

(b)

22



- 23 Diagram 23 shows the function  $f: x \rightarrow \frac{x+10}{x-8}$ ,  $x \neq 8$  and its inverse function,  $f^{-1}$ .  
 Rajah 23 menunjukkan suatu fungsi  $f: x \rightarrow \frac{x+10}{x-8}$ ,  $x \neq 8$  dan fungsi songsangnya,  $f^{-1}$ .

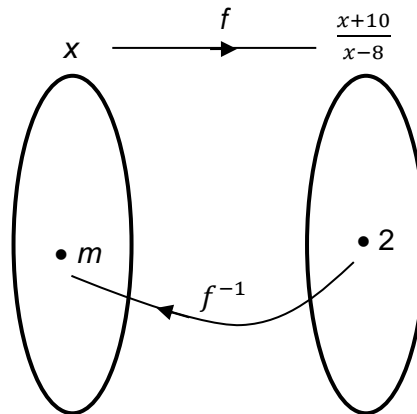
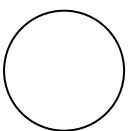
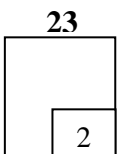


Diagram 23  
 Rajah 23

Find the value of  $m$ .  
 Cari nilai  $m$ .

[2 marks]  
 [2 markah]

Answer/Jawapan :





- 24 Diagram 24 shows nine letter cards.  
*Rajah 24 menunjukkan sembilan keping kad huruf.*



Diagram 24  
*Rajah 24*

A nine-letter code is to be formed using all these cards.  
*Suatu kod sembilan huruf dibentuk dengan menggunakan semua kad ini.*

Find,  
*Cari,*

- (a) the number of different nine-letter codes that can be formed,  
*bilangan kod sembilan huruf yang berlainan yang dapat dibentuk,*
- (b) the number of different nine-letter codes which  
*bilangan kod sembilan huruf yang berlainan yang*
- (i) must begin with the letter M and end with the letter N or vice versa,  
*mesti bermula dengan huruf M dan berakhir dengan huruf N atau sebaliknya,*
- (ii) the letter M and the letter N must be separated by four other different letters.  
*huruf M dan huruf N mesti dipisahkan oleh empat huruf yang berlainan.*

[4 marks]  
 [4 markah]

Answer/Jawapan:

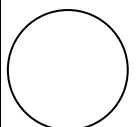
(a)

(b)(i)

(ii)

24

4



25 A set of data consists of 2, 3, 6 and 9.  
*Suatu set data terdiri daripada 2, 3, 6 dan 9.*

- (a) Determine the mean and the standard deviation of the data.  
*Tentukan min dan sisihan piawai bagi data itu.*
- (b) Two numbers,  $\alpha$  and  $\beta$ , are to be added to this set of data, such that the mean is increased by 1 and the variance is increased by 2.5. Find the value of  $\alpha$  and the value of  $\beta$ .  
*Dua nombor,  $\alpha$  dan  $\beta$ , ditambah kepada set data ini dengan keadaan min nya akan bertambah sebanyak 1 dan variansnya bertambah sebanyak 2.5. Cari nilai  $\alpha$  dan nilai  $\beta$ .*

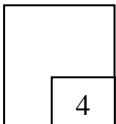
[4 marks]  
[4 markah]

Answer/Jawapan :

(a)

(b)

25



4

**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	14	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	18	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	8	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

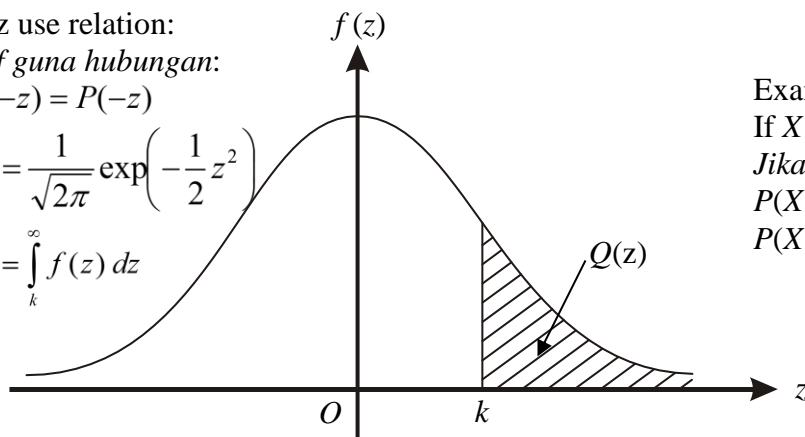
For negative z use relation:

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

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

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

## 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 soalan.*
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 **27**  
*Jadual Kebarangkalian Hujung Atas  $Q(z)$  Bagi Taburan Normal  $N(0,1)$  disediakan di halaman 27*
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 soalan ini kepada pengawas peperiksaan di akhir peperiksaan.*