

Answer **all** questions.

Jawab **semua** soalan.

$$A = \{ -3, -2, -1, 0, 1, 2 \}$$
$$B = \{ -1, 0, 1, 2, 3 \}$$

1. Based on the above information, the relation between  $A$  and  $B$  is defined by the set of ordered pairs

$$\{ (-2, -1), (-1, 0), (0, 1), (1, 2), (2, 3) \}.$$

*Berdasarkan maklumat atas, hubungan antara  $A$  dan  $B$  adalah di takrifkan oleh set pasangan bertertib*

$$\{ (-2,-1), (-1, 0), (0, 1), (1, 2), (2, 3) \}.$$

State

*Nyatakan*

(a) the image of 2.

*imej bagi 2.*

(b) the object of 0.

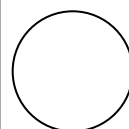
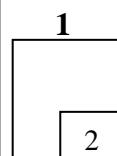
*objek bagi 0.*

[2 marks]

[2 markah]

Answer : (a).....

(b).....



2. Given that  $f^{-1} : x \rightarrow x - 1$  and  $gf : x \rightarrow 3x^2 - 2$ , find

*Diberi fungsi  $f^{-1} : x \rightarrow x - 1$  dan  $gf : x \rightarrow 3x^2 - 2$ , cari*

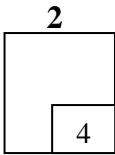
- (a) the function  $g(x)$ ,  
*fungsi  $g(x)$ ,*
- (b) the values of  $x$  if  $g(x) + 3 = x$   
*nilai-nilai  $x$  jika  $g(x) + 3 = x$ .*

[4 marks]

[4 markah]

Answer : (a).....

(b).....



3. Given the function  $h : x \rightarrow 2x^2 + 5x$ , find

*Diberi fungsi  $h : x \rightarrow 2x^2 + 5x$ , cari*

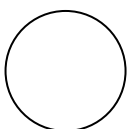
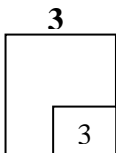
- (a)  $h(3)$ ,
- (b) the values of  $x$  which maps onto itself by  $h(x)$ .  
*nilai-nilai  $x$  yang memetakan kepada sendiri oleh  $h(x)$ .*

[3 marks]

[3 markah]

Answer : (a).....

(b).....



4. The quadratic equation  $x(x + y) + 8 = 0$  does not intersects the straight line  $x + 2y = p$ , where  $p$  is a constant. Find the range of values of  $p$ .

*Persamaan  $x(x + y) + 8 = 0$  tidak menyilang garis lurus  $x + 2y = p$ , dengan keadaan  $p$  adalah pemalar. Cari julat nilai  $p$ .*

[3 marks]  
[3 markah]

4
3

Answer : .....

5. Diagram 5 shows the graph of the function  $y = -(x - p)^2 + \frac{25}{4}$  where  $p$  is a constant.

*Rajah 5 menunjukkan fungsi  $y = -(x - p)^2 + \frac{25}{4}$ , dengan keadaan  $p$  ialah pemalar.*

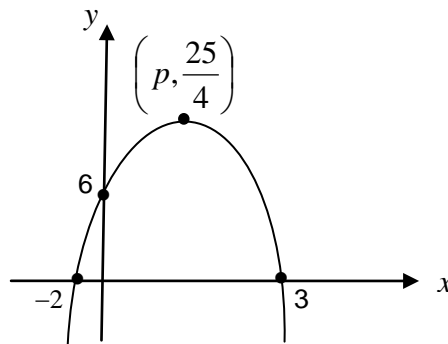


Diagram 5  
Rajah 5

Find  
Cari

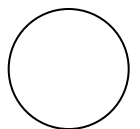
- (a) the value of  $p$ ,  
*nilai  $p$ ,*
- (b) the equation of the axis of symmetry.  
*persamaan paksi simetri.*

[2 marks]  
[2 markah]

5
2

Answer : (a).....

(b).....



6. Given a quadratic function  $f(x) = 8x + 2x^2 = 2(x + hk)^2 + k$ , where  $h$  and  $k$  are constants.

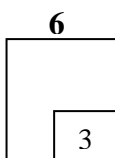
*Diberi fungsi kuadratik  $f(x) = 8x + 2x^2 = 2(x + hk)^2 + k$ , dengan keadaan  $h$  dan  $k$  adalah pemalar.*

State the value of  $h$  and value of  $k$ ,  
*Nyatakan nilai  $h$  dan nilai  $k$ ,*

[3 marks]  
[3 markah]

Answer: .....

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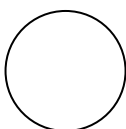
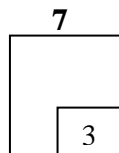
7. Solve the equation  $4^{2x-1} + 4^{2x} = 4$ .

*Selesaikan persamaan  $4^{2x-1} + 4^{2x} = 4$*

[3 marks]  
[3 markah]

Answer: .....

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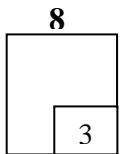


8. Given  $\log_m 3 = p$  and  $\log_m 5 = r$ , express  $\log_{\sqrt{m}}\left(\frac{125m}{81}\right)$  in terms of  $p$  and  $r$ .

*Diberi  $\log_m 3 = p$  dan  $\log_m 5 = r$ , ungkapkan  $\log_{\sqrt{m}}\left(\frac{125m}{81}\right)$  dalam sebutan  $p$  dan  $r$ .*

[3marks]  
[3 markah]

Answer .....



9. Given the first three terms of an arithmetic progression are  $2h - 6$ ,  $h + 1$  and  $h - 4$ , find

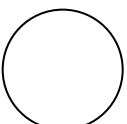
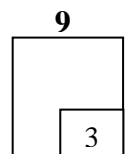
*Diberi tiga sebutan pertama suatu janjang aritmetik ialah  $2h - 6$ ,  $h + 1$  dan  $h - 4$ , cari*

- (a) the value of  $h$ ,  
*nilai  $h$ ,*
- (b) the common difference of the progression.  
*nisbah sepunya janjang itu..*

[3 marks]  
[3 markah]

Answer: (a).....

(b).....



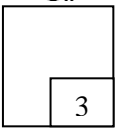
10. The first term of the geometric progression is 0.6 and the fourth term of the progression is 9.375 , find the sum of the first three terms.

*Sebutan pertama suatu jangjang geometri ialah 0.6 dan sebutan keempat jangjang aritmetik ialah 9.375 , cari jumlah tiga sebutan pertama.*

[3 marks]

[3 markah]

**10**



Answer : .....

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11. The  $n^{th}$  term of a geometric progression ,  $T_n$  , is given by  $T_n = \left(\frac{3}{4}\right)^{n+1}$  , find

*Sebutan ke- $n$  bagi suatu jangjang geometri ,  $T_n$  , diberi oleh  $T_n = \left(\frac{3}{4}\right)^{n+1}$  ,*

*cari*

(a) the common ratio,

*nisbah sepunya,*

(b) the sum to infinity of the progression.

*jumlah sehingga ke tak terhinggaan.*

[4 marks]

[4 markah]

**11**



Answer : (a).....

(b).....

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12. Diagram 12 shows a sector  $AOB$  of a circle with center  $O$  and radius  $r$  cm.

Rajah 12 menunjukkan sektor  $AOB$  bagi sebuah bulatan berpusat  $O$  dan berjejari  $x$  cm.

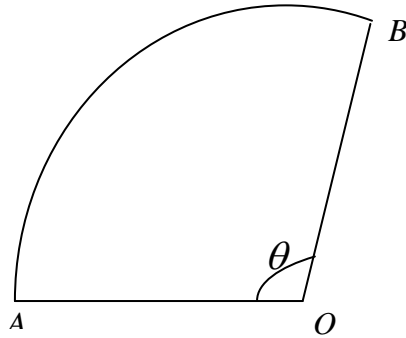


Diagram 12  
Rajah 12

Given the length of the arc  $AB = 30.5$  cm and the perimeter of the sector  $AOB$  is  $55.5$  cm.

Diberi panjang bagi lengkok  $AB = 30.5$  cm dan perimeter sektor  $AOB$  adalah  $55.5$  cm.

Find

Cari

[ Use/Guna  $\pi = 3.142$  ]

- (a)  $\theta$ , in radians,  
 $\theta$ , dalam radian,
- (b) the area, in  $\text{cm}^2$ , of the sector  $AOB$ .  
luas, dalam  $\text{cm}^2$ , sektor  $AOB$ .

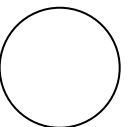
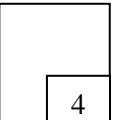
[4 marks]

[4 markah]

Answer: (a).....

(b).....

12



13. The following information refers to the vectors  $\vec{p}$  and  $\vec{q}$ .

Maklumat berikut adalah berkaitan dengan vektor-vektor  $\vec{p}$  dan  $\vec{q}$ .

$$\vec{p} = 5\vec{i} - 12\vec{j}$$
$$\vec{q} = m\vec{i} + 6\vec{j}$$

where  $m$  is a constants.  
dengan keadaan  $m$  ialah pemalar.

By using the information given, find

Dengan menggunakan maklumat di atas, cari

(a) the value of  $m$  if the vector of  $\vec{p}$  and the vector of  $\vec{q}$  are parallel,

nilai  $m$  jika vektor  $\vec{p}$  dan vektor  $\vec{q}$  adalah selari,

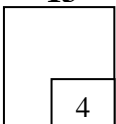
(b) the unit vector in direction of  $\vec{p}$ .

vector unit dalam arah  $\vec{p}$ .

[4 marks]

[4 markah]

13



Answer: (a).....

(b).....

14. Diagram 14 shows a parallelogram  $PQRS$  and  $STQ$  is a straight line.

*Rajah 14 menunjukkan segiempat selari  $PQRS$  dan  $STQ$  ialah garis lurus.*

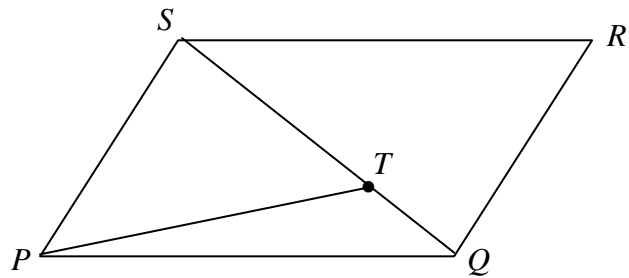


Diagram 14  
Rajah 14

Given  $\vec{PQ} = 12a$ ,  $\vec{PS} = 6b$  and  $ST = 2TQ$ , express in terms of  $a$  and  $b$ .

Diberi  $\vec{PQ} = 12a$ ,  $\vec{PS} = 6b$  dan  $ST = 2TQ$ , ungkapkan dalam sebutan  $a$  dan  $b$ .

(a)  $\vec{SQ}$ ,

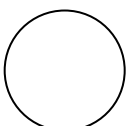
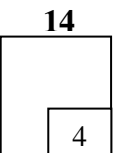
(b)  $\vec{PT}$ .

[4 marks]

[4 markah]

Answer : (a).....

(b).....



15. Given that  $x$  and  $y$  are related by the equation  $x + \frac{m}{x} = ny$ , where  $m$  and  $n$  are constants. A straight line is obtained by plotting  $xy$  against  $x^2$ , as shown in Diagram 15.

Diberi  $x$  dan  $y$  dihubungkan oleh persamaan  $x + \frac{m}{x} = ny$ , dengan keadaan  $m$  dan  $n$  adalah pemalar. Suatu graf garis lurus diperolehi apabila memplotkan  $xy$  melawan  $x^2$ , seperti dalam Rajah 15.

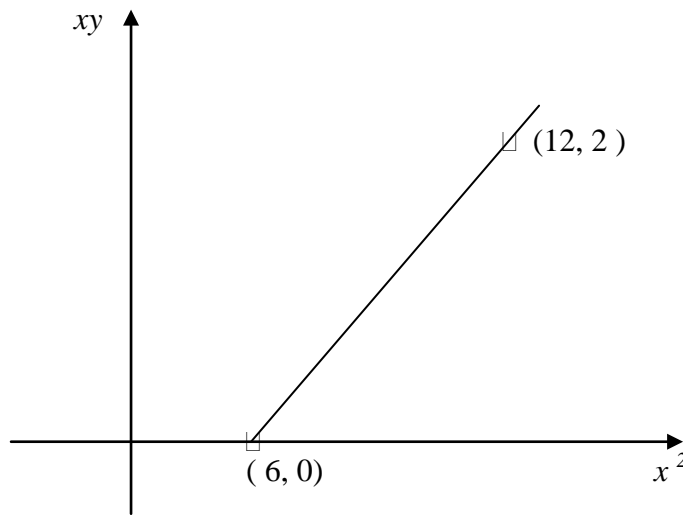


Diagram 15  
Rajah 15

Calculate the value of  $m$  and of  $n$ .

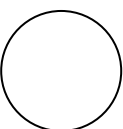
Cari nilai  $m$  dan nilai  $n$ .

[4 marks]

[4 markah]

15

4
---



Answer:  $m = \dots\dots\dots$

$n = \dots\dots\dots$

16. A point  $P(8, t)$  divides the line joining  $M(4, 1)$  and  $N(r, 7)$  such that  $2MP = 3PN$ .

*Titik  $P(8, t)$  membahagi garis yang menyambung  $M(4,1)$  dan  $N(r, 7)$  dengan keadaan  $2MP = 3PN$ .*

Find the value of

*Cari nilai bagi*

(a)  $r$

(b)  $t$

[3 marks]

[3 markah]

16

3

Answer: (a).....

(b).....

17. Solve the equation  $3 \sin 2x = 4 \cos x$  such that  $0^\circ \leq x \leq 360^\circ$ .

*Selesaikan persamaan  $3 \sin 2x = 4 \cos x$  untuk  $0^\circ \leq x \leq 360^\circ$ .*

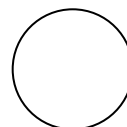
[4 marks]

[4 markah]

17

4

Answer: .....



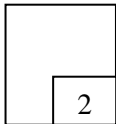
18. Find  $f''(x)$  for the function  $f(x) = (x^2 + 3)^3$

*Cari  $f''(x)$  bagi fungsi  $f(x) = (x^2 + 3)^3$ .*

[3 marks]

[3 markah]

18



*Jawapan :* .....

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19. The curve  $y = 2x^2 + hx + 3$  has a gradient of  $-3$  at the point where  $x = -1$

find the value of  $h$ .

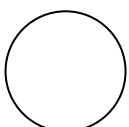
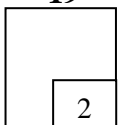
*Persamaan lengkung  $y = 2x^2 + hx + 3$ , mempunyai kecerunan  $-3$  pada*

*$x = -1$ , cari nilai bagi  $h$ .*

[3 marks]

[3 markah]

19



*Answer :* .....

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20. Given that  $\int_1^5 g(x)dx = 5$ , find the value of  $m$  if  $\int_1^5 [mx - 2g(x)]dx = -3m$ .

Diberi  $\int_1^5 g(x)dx = 5$ , cari nilai bagi  $m$  jika  $\int_1^5 [mx - 2g(x)]dx = -3m$ .

[3 marks]

[3 markah]

20

3

Answer: .....

21. Table 21 shows the frequency distribution of ages of workers.

Jadual 21 menunjukkan taburan frekuensi bagi umur pekerja.

Age/Umur ( years/tahun )	28-32	33-37	38-42	43-47	48-52
Number of workers/ Bilangan pekerja	16	38	26	11	9

Table 21

Jadual 21

Given the third quartile of ages of workers is  $K = L + \left(\frac{75 - F}{G}\right)5$ ,

find the values of  $K$ ,  $L$ ,  $G$  and  $F$ .

Diberi kuartil ketiga bagi umur pekerja-pekerja adalah  $K = L + \left(\frac{75 - F}{G}\right)5$ ,

cari nilai-nilai bagi  $K$ ,  $L$ ,  $G$  dan  $F$ .

[ 4 marks ]

Answer:  $K = \dots\dots\dots$

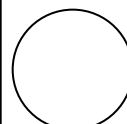
$L = \dots\dots\dots$

$G = \dots\dots\dots$

$F = \dots\dots\dots$

21

4



22. A debating team consists of 5 students. These 5 students are chosen from 4 monitors, 2 assistant monitors and 6 prefects. Calculate the number of different ways the team can be formed if

*Suatu pasukan bahas terdiri dari 5 orang pelajar. Pelajar-pelajar ini akan dipilih dari 4 orang ketua kelas, 2 orang penolong ketua kelas dan 6 orang pengawas sekolah. Kira bilangan cara pasukan ini boleh dibentuk jika*

(a) there is no restriction

*tiada syarat dikenakan*

(b) the team contains only one monitor and exactly 3 prefects

*pasukan ini terdiri dari hanya seorang ketua kelas dan tepat 3 orang pengawas.*

[3 marks]

[3 markah]

Answer : (a).....

(b).....

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23. Four girls and three boys are to be seated in a row. Calculate the number of possible arrangements if

*Empat orang perempuan dan tiga orang lelaki akan duduk dalam satu barisan. Cari bilangan susunan jika*

(a) all the three boys have to be seated together

*semua lelaki akan duduk bersebelahan antara satu sama lain.*

(b) a boy has to be seated at the centre

*seorang lelaki akan duduk di tengah barisan itu.*

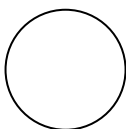
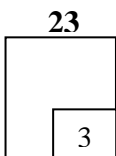
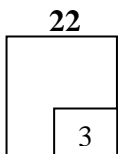
[3 marks]

[3 markah]

Answer : (a).....

(b).....

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24. In a box of oranges, 15% of the fruits are rotten. If 10 oranges are chosen at random from the box, find the probability that

*Dalam suatu kotak yang mengandungi buah oren, 15% daripada buah tersebut adalah busuk . Jika 10 biji oren dipilih secara rawak dari kotak itu, cari kebarangkalian*

- (a) exactly 5 rotten oranges are chosen,  
*tepat 5 biji oren dipilih adalah busuk,*
- (b) not more than 2 rotten oranges are chosen.  
*tidak lebih daripada 2 biji oren yang dipilih adalah busuk.*

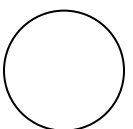
[4 marks]

[4 markah]

Answer : (a).....

(b).....

24
3



25. Diagram 25 shows a standard normal distribution graph.  
*Rajah 25 menunjukkan suatu graf taburan normal piawai.*

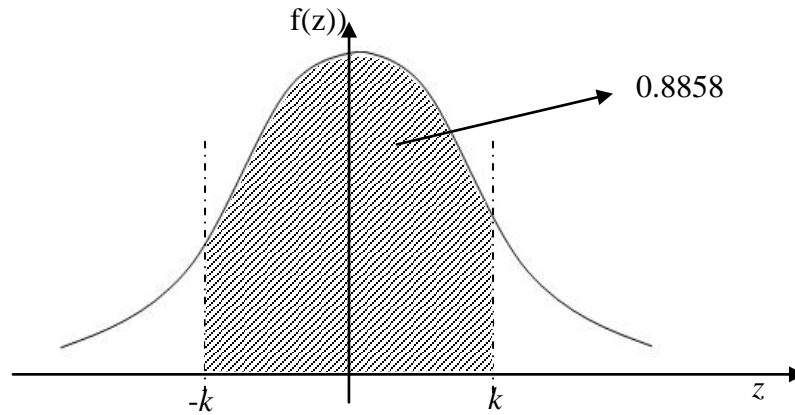


Diagram 25  
*Rajah 25*

The probability represented by the area of the shaded region is 0.8858.  
*Kebarangkalian yang diwakili sebagai luas kawasan berlerek ialah 0.8858.*

- (a) Find the value of  $P(Z > k)$   
*Cari nilai bagi  $P(Z > k)$*
- (b)  $X$  is a continuous random variable which is normally distributed with a mean of  $\mu$  and a variance of 4.

If the value of  $X$  is 85 when the  $Z$ -score is  $k$ , find the value of  $\mu$ .  
 *$X$  adalah pembolehubah rawak selanjar yang bertabur secara normal mempunyai min,  $\mu$  dan varians, 4, cari nilai bagi  $\mu$ .*

[3 marks]

25
3

Answer: (a).....

(b).....

**END OF QUESTION PAPER**

**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 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 answer 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 2 to 4.
10. Four-figure mathematical tables are allowed.
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 beri **satu** jawapan sahaja.*
4. *Jawapan anda hendaklah ditulis pada ruang yang disediakan dalam kertas soalan ini.*
5. *Tunjukkan langkah-langkah penting dalam kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.*
6. *Jika anda hendak menukar jawapan, batalkan dengan kemas jawapan yang telah dibuat. Kemudian tulis jawapan yang baharu.*
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 2 hingga 4.*
10. *Buku sifir matematik empat angka dibenarkan.*
11. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*
12. *Serahkan kertas soalan ini kepada pengawas peperiksaan pada akhir peperiksaan.*