

Matematik Tambahan K1 Trial SPM SBP 2020

Telegram @soalanpercubaanspm

Answer all questions.

Jawab semua soalan.

For  
Examiner's  
Use

- 1 Form a quadratic equation with roots  $a$  and  $\frac{2}{a}$ .

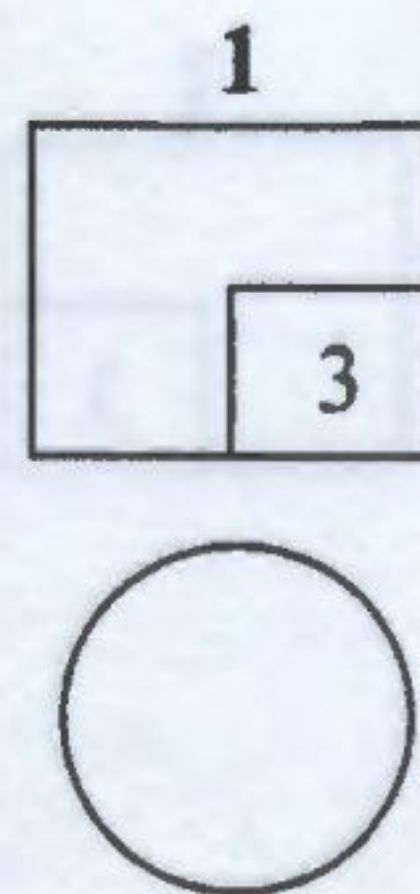
Give your answer in general form.

*Bentukkan persamaan kuadratik dengan punca-punca  $a$  dan  $\frac{2}{a}$ .**Beri jawapan anda dalam bentuk am.*

[3 marks]

[3 markah]

Answer / Jawapan :



For  
Examiner's  
Use

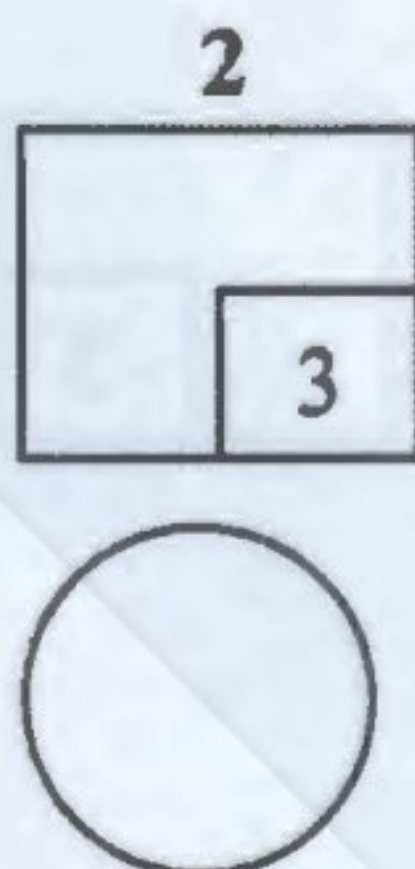
- 2 A group of 150 students were selected to complete a science project in a certain number of weeks. On the second week, 4 students withdrew from the project. The next following week, another 4 students quit and so on. Find the number of weeks in which the work was completed when only 22 students left.

*Sekumpulan 150 orang pelajar telah dipilih untuk menyiapkan suatu projek sains dalam beberapa minggu tertentu. Pada minggu kedua, 4 orang pelajar menarik diri dari projek tersebut. Pada minggu berikutnya, 4 orang pelajar lain menarik diri dan seterusnya. Cari bilangan minggu projek tersebut dapat diselesaikan apabila hanya terdapat 22 orang pelajar sahaja yang tinggal pada minggu tersebut.*

[3 marks]

[3 markah]

Answer / Jawapan :



3. It is given that  $1$ ,  $m^2$  and  $m^4$  are first three consecutive terms of a geometric progression.

*Diberi bahawa  $1$ ,  $m^2$  dan  $m^4$  ialah tiga sebutan pertama berturutan bagi suatu jangjang geometri.*

Find the sum to infinity of the progression in terms of  $m$ .

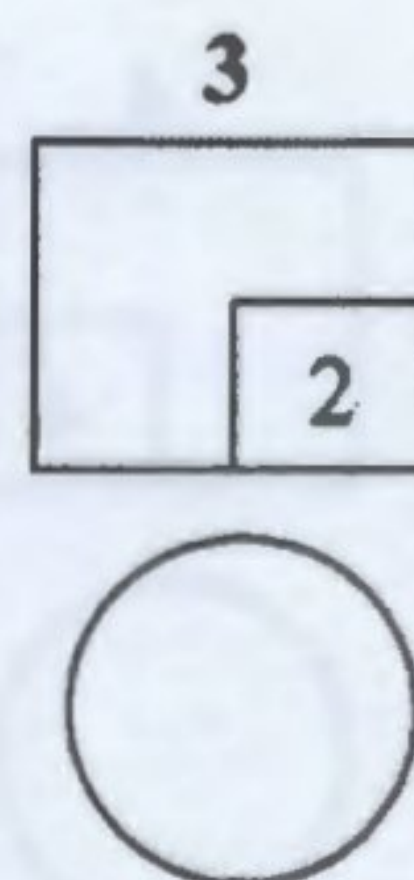
*Cari hasil tambah sebutan hingga ketakterhinggaan jangjang itu dalam sebutan  $m$ .*

[2 marks]

[2 markah]

Answer / Jawapan :

For  
Examiner's  
Use



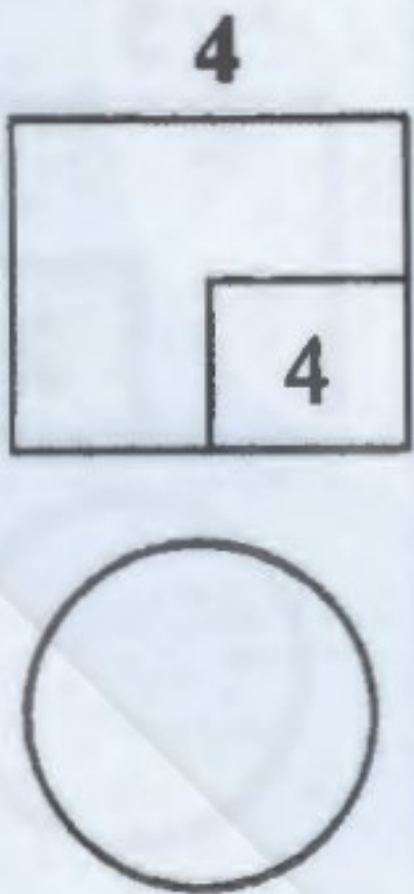
For,  
Examiner's  
Use

- 4 The curve  $y = f(x)$  is such that  $\frac{d^2y}{dx^2} = 18x$ . Given that  $\frac{dy}{dx} = 13$  and  $y = 11$  when  $x = 1$ , find the equation of the curve.

Suatu lengkung  $y = f(x)$  adalah dengan keadaan  $\frac{d^2y}{dx^2} = 18x$ . Diberi bahawa  $\frac{dy}{dx} = 13$  dan  $y = 11$  apabila  $x = 1$ , cari persamaan lengkung itu.

[4 marks]  
[4 markah]

Answer / Jawapan :



- 5 Diagram 1 shows two curves  $y = h(x)$ ,  $y = g(x)$  and the tangent to each curve when  $x = 0$ .

For  
Examiner's  
Use

Rajah 1 menunjukkan dua lengkung  $y = h(x)$ ,  $y = g(x)$  dan garis tangen kepada setiap lengkung itu apabila  $x = 0$ .

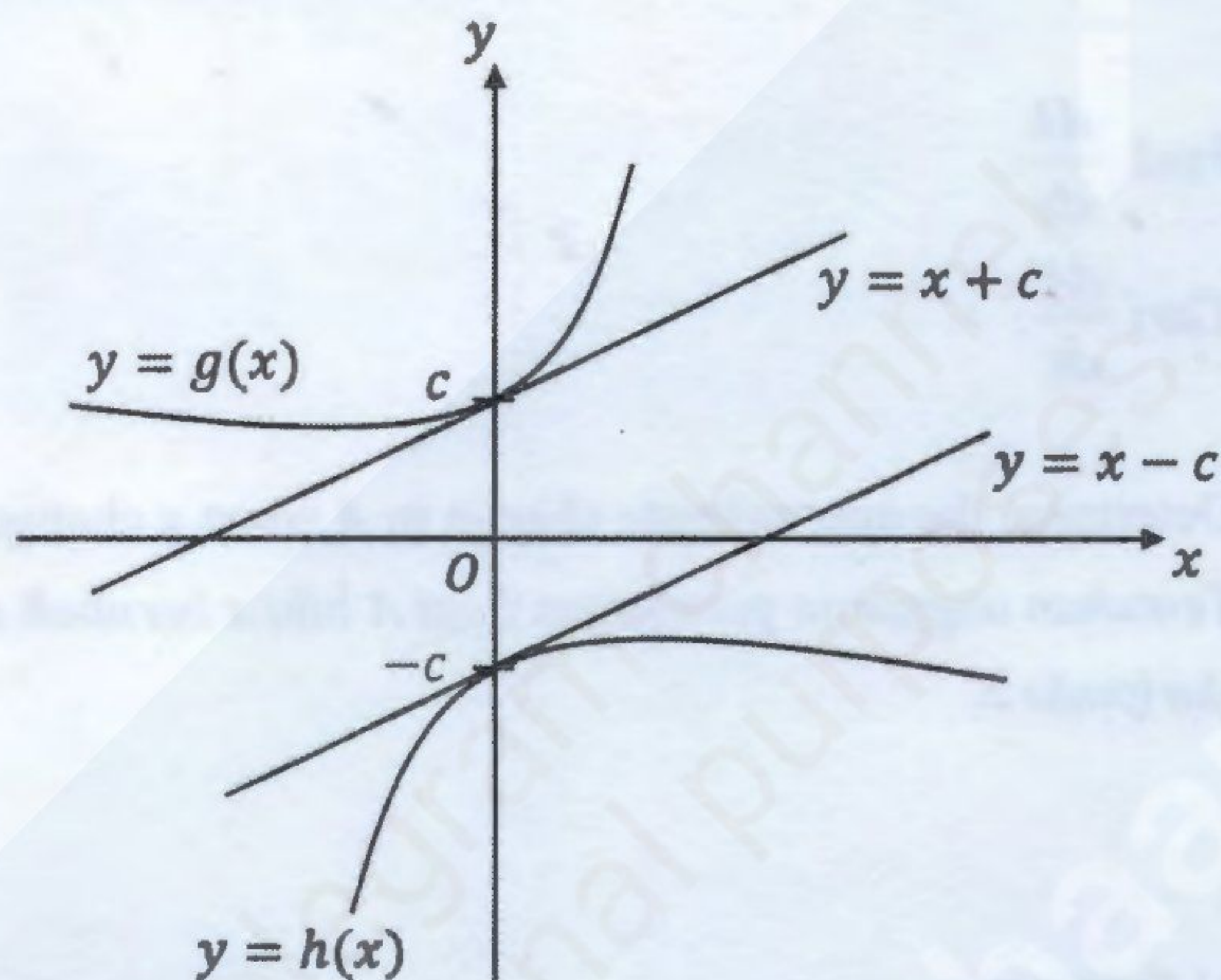


Diagram 1  
Rajah 1

The two tangent lines are parallel and the gradient of the tangent line  $y = g(x)$  at point  $P$  is 1. Telegram @soalanpercubaanspm

Kedua-dua garis tangen tersebut adalah selari dan kecerunan garis tangen  $y = g(x)$  pada titik  $P$  ialah 1.

It is given that  $f(x) = \frac{h(x)}{g(x)}$ , find  $f'(0)$ .

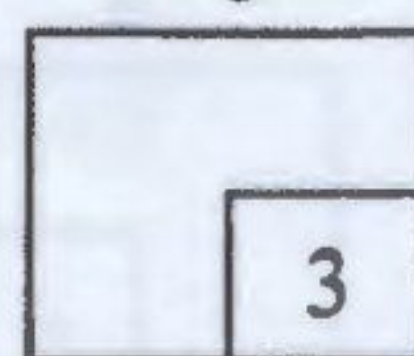
Diberi bahawa  $f(x) = \frac{h(x)}{g(x)}$ , cari  $f'(0)$ .

[3 marks]

[3 markah]

Answer / Jawapan :

5



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Examiner's  
Use

6

The function  $A$  is defined by  $A = \frac{1}{2}x^2(x+2)$ .

Fungsi  $A$  ditakrifkan oleh persamaan  $A = \frac{1}{2}x^2(x+2)$ .

(a) Find  $\frac{dA}{dx}$ .

Cari  $\frac{dA}{dx}$ .

(b) Determine the approximate change in  $A$  when  $x$  changes by  $p\%$  of 2.

Tentukan anggaran perubahan bagi  $A$  bila  $x$  berubah sebanyak  $p\%$  daripada 2.

[4 marks]

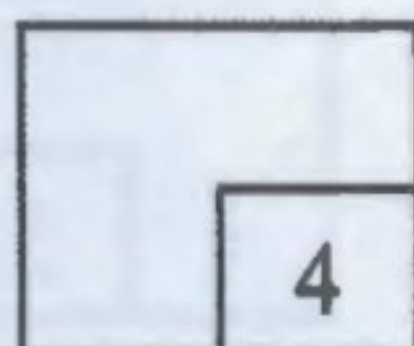
[4 markah]

Answer / Jawapan :

(a)

(b)

6



7' It is given that  $k(x)$  is a function such that  $x = \frac{7+k(x)}{3-k(x)}$ , find  $k^{-1}(2)$ .

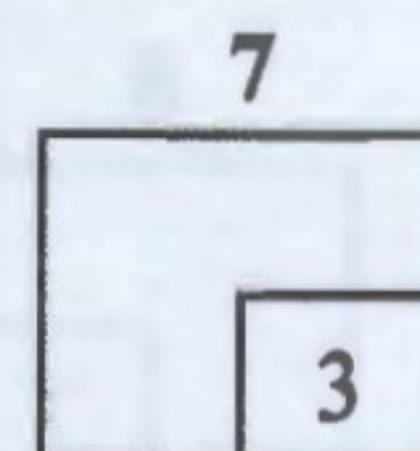
Diberi bahawa  $k(x)$  ialah suatu fungsi dengan keadaan  $x = \frac{7+k(x)}{3-k(x)}$ , cari  $k^{-1}(2)$ .

For  
Examiner's  
Use

[3 marks]

[3 markah]

Answer / Jawapan :



For  
Examiner's  
Use

8

Given the function  $f(x) = mx - 5$  and  $f^2(x) = 36x + 25$ , where  $m$  is a constant and  $m < 0$ .

Diberi fungsi  $f(x) = mx - 5$  dan  $f^2(x) = 36x + 25$ , dengan keadaan  $m$  ialah pemalar dan  $m < 0$ .

(a) Express  $f(3)$  in terms of  $m$ .  
Ungkapkan  $f(3)$  dalam sebutan  $m$ .

(b) Find the value of  $m$ .  
Cari nilai bagi  $m$ .

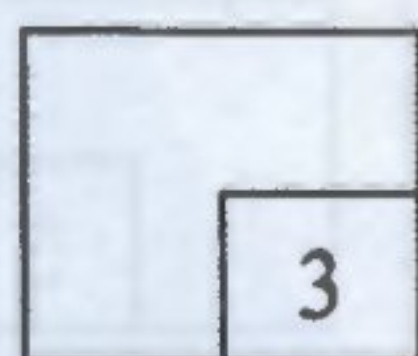
[3 marks]  
[3 markah]

Answer / Jawapan :

(a)

(b)

8



9. Table 1 below shows a set of positive integers which is arranged in ascending order.  
*Jadual 1 di bawah menunjukkan satu set integer positif yang disusun dalam tertib menaik.*

For  
Examiner's  
Use

|                                |   |        |   |        |    |    |
|--------------------------------|---|--------|---|--------|----|----|
| <b>Integer<br/>Integer</b>     | 1 | $2v-1$ | 6 | $2v+2$ | 10 | 12 |
| <b>Frequency<br/>Kekerapan</b> | 5 | 3      | 6 | $k$    | 2  | 5  |

Table 1  
*Jadual 1*

If  $v$  and  $k$  are positive integers,  
*Jika  $v$  dan  $k$  ialah integer positif,*

- (a) Find the range of  $k$  if the mode is 6.  
*Cari julat bagi  $k$  jika mod ialah 6.*  
 Telegram @soalanpercubaanspm
- (b) Let  $k = 7$ ,  
*Andaikan  $k = 7$ ,*
- express the median in terms of  $v$ ,  
*ungkapkan median dalam sebutan  $v$ ,*
  - find the value of  $v$ .  
*cari nilai  $v$ .*

[4 marks]  
 [4 markah]

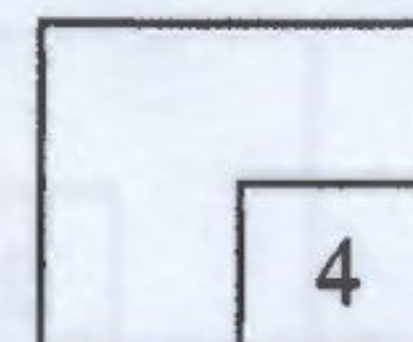
Answer / Jawapan :

(a)

(b) (i)

(ii)

9



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For .  
Examiner's  
Use

- 10 Given a set of data as follow.  
*Diberi satu set data seperti berikut.*

2, 6, 8, 3, 10, 5

- (a) Find the first quartile.  
*Cari kuartil pertama.*
- (b) If each value of the set of data is multiplied by 5 and then 10 is added to it, find the new first quartile.  
*Jika setiap nilai set data tersebut didarabkan dengan 5 dan kemudian ditambah dengan 10, cari kuartil pertama yang baru.*

[2 marks]

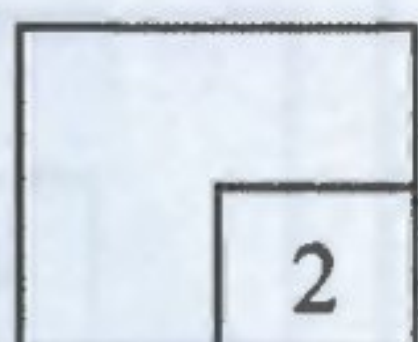
[2 markah]

Answer / Jawapan :

(a)

(b)

10



- 11 Diagram 2 shows the graph of  $\frac{y}{x^2}$  against  $x$ .

Rajah 2 menunjukkan graf  $\frac{y}{x^2}$  melawan  $x$ .

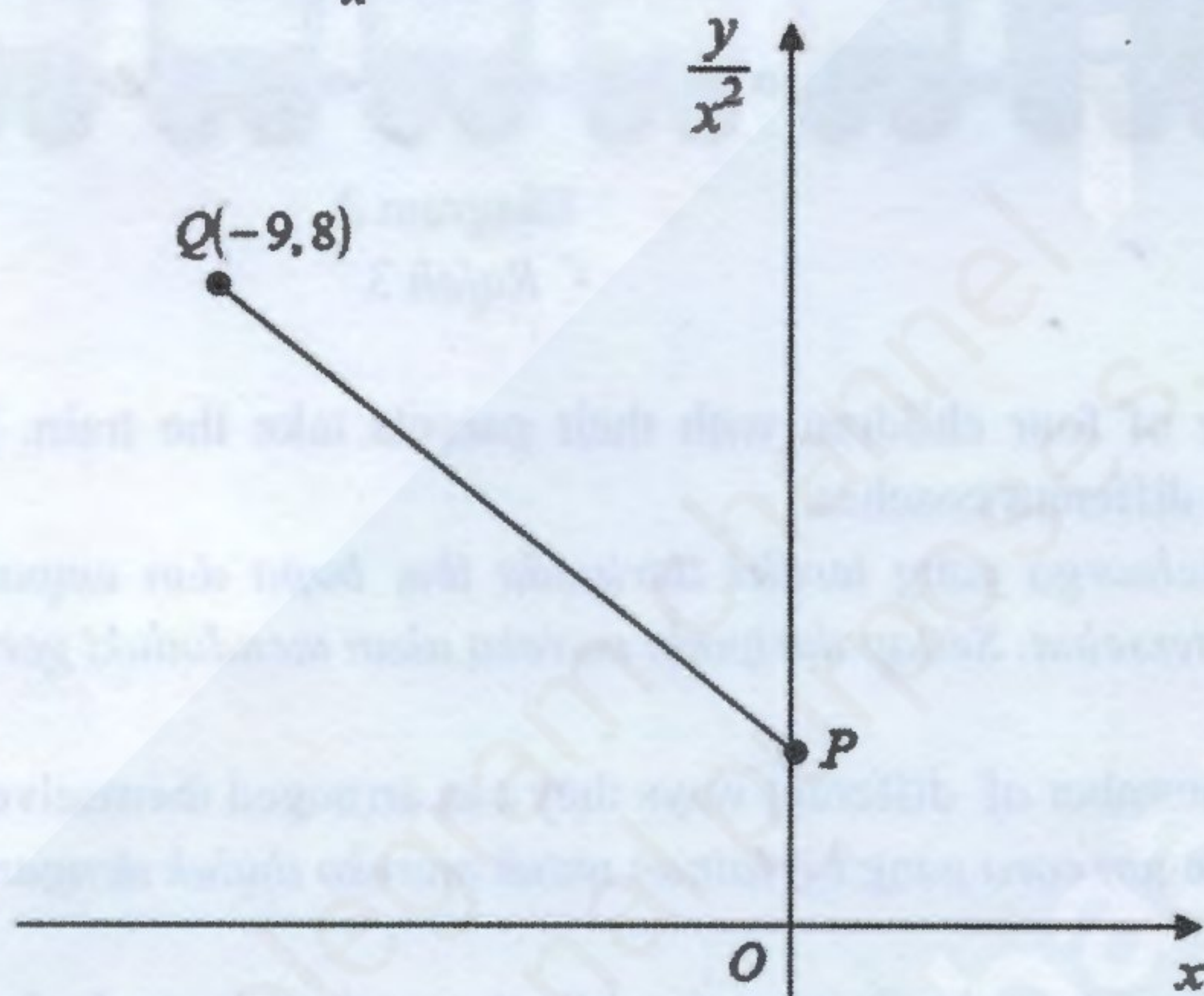


Diagram 2

Rajah 2

It is given that the gradient of straight line  $PQ$  is  $-\frac{2}{3}$  and point  $P$  lies on the  $\frac{y}{x^2}$ -axis.

Express  $y$  in terms of  $x$ .

Diberi bahawa kecerunan garis lurus  $PQ$  ialah  $-\frac{2}{3}$  dan titik  $P$  terletak atas paksi- $\frac{y}{x^2}$ .

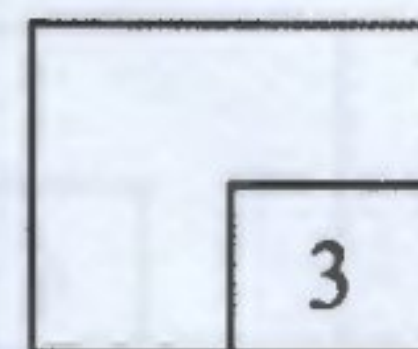
Ungkapkan  $y$  dalam sebutan  $x$ .

[3 marks]

[3 markah]

Answer / Jawapan :

11



For  
Examiner's  
Use

- 12 Diagram 3 shows six coaches of a train at an amusement park.  
*Rajah 3 menunjukkan enam gerabak keretapi di sebuah tapak hiburan.*



Diagram 3  
*Rajah 3*

A family of four children with their parents take the train. Each of them will be sitting in different coaches.

*Sebuah keluarga yang terdiri daripada ibu, bapa dan empat orang anak menaiki keretapi tersebut. Setiap daripada mereka akan menduduki gerabak yang berlainan.*

Find the number of different ways they can arranged themselves in such a way that  
*Cari bilangan cara yang berlainan untuk mereka duduk dengan keadaan*

- (a) father sits in the first coach while the mother sits in the last coach.  
*bapa duduk di gerabak pertama manakala ibu duduk di gerabak terakhir.*
- (b) their parents and the youngest child must sit in three consecutive coaches.  
*ibu bapa dan anak bongsu mesti duduk di dalam tiga gerabak yang berturutan.*

[4 marks]

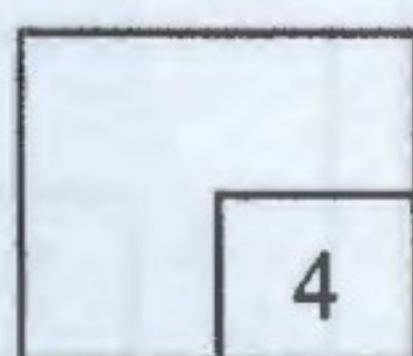
[4 markah]

Answer / Jawapan :

(a)

(b)

12



- 13 Table 2 shows the number of red and yellow marbles labelled with letter *A* and *B* in a box.

*Jadual 2 menunjukkan bilangan guli berwarna merah dan kuning yang berlabel A dan B di dalam sebuah kotak.*

*For  
Examiner's  
Use*

| <div> <div>Colour</div> <div>Warna</div> </div> <div> <div>Letter</div> <div>Huruf</div> </div> | Red | Yellow |
|-------------------------------------------------------------------------------------------------|-----|--------|
| <div> <div>Red</div> <div>Merah</div> </div> <div> <div>Yellow</div> <div>Kuning</div> </div>   |     |        |
| <i>A</i>                                                                                        | 2   | 6      |
| <i>B</i>                                                                                        | 4   | 5      |

Table 2  
*Jadual 2*

Two marbles are drawn randomly from the box. Find the probability that both marbles are labelled with the same letter but with a different colour.

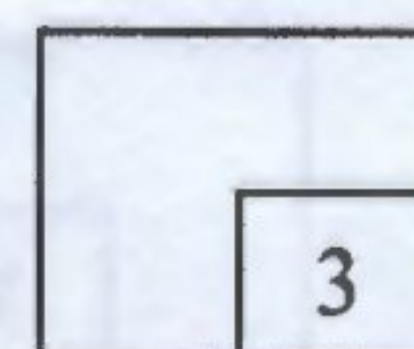
*Dua biji guli dipilih secara rawak daripada kotak itu. Cari kebarangkalian bahawa kedua-dua guli itu dilabel dengan huruf yang sama tetapi berlainan warna.*

[3 marks]

[3 markah]

Answer / Jawapan :

13



For  
Examiner's  
Use

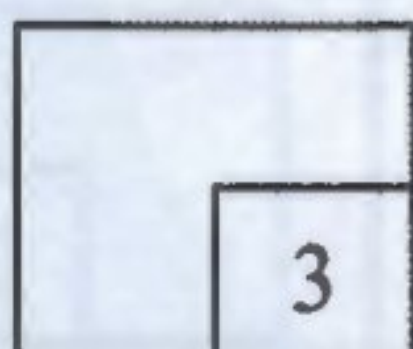
- 14 Find the value of :  
Cari nilai bagi :

$$4^a \times 16^{2a} \times \frac{1}{32^{2a}}$$

[3 marks]  
[3 markah]

Answer / Jawapan :

14



- 15 Find the value of  $x$  which satisfy the following equation :  
*Cari nilai  $x$  yang memuaskan persamaan berikut :*

$$\frac{2}{\log_x xy} + \frac{2}{\log_y xy} + 3 = 5x$$

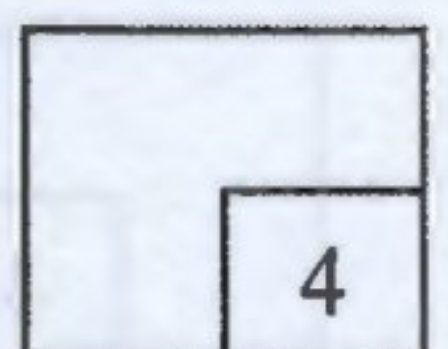
[4 marks]

[4 markah]

Answer / Jawapan :

For  
Examiner's  
Use

15



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For  
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Use

- 16 Diagram 4 shows part of a circle with centre  $O$  and radius 12 cm.  
*Rajah 4 menunjukkan sebuah bulatan berpusat  $O$  dan jejari 12 cm.*

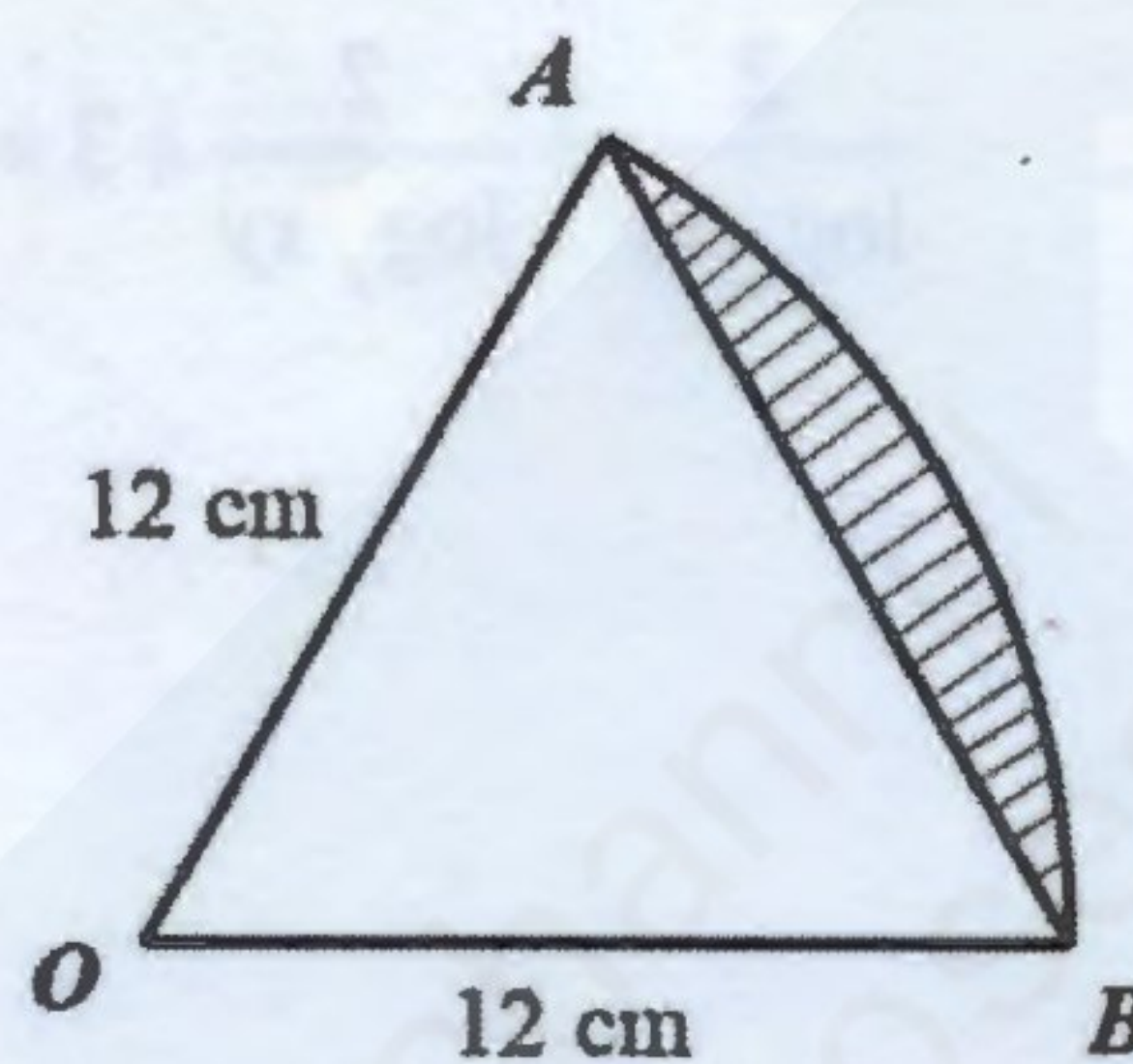


Diagram 4  
*Rajah 4*

Given the length of arc  $AB$  is  $4\pi$  cm, calculate,  
*Diberi bahawa panjang lengkok  $AB$  ialah  $4\pi$  cm, kira,*

- (a) the angle of  $AOB$  in radians,  
*sudut  $AOB$  dalam radian,*

[1 mark]  
[1 markah]

- (b) the area of the shaded region.  
*luas kawasan berlorek.*

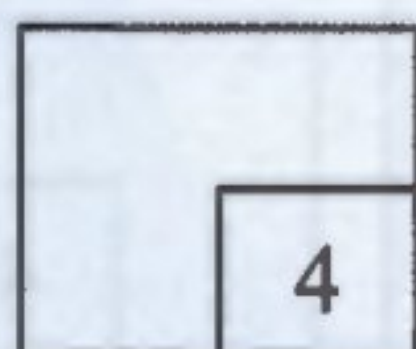
[3 marks]  
[3 markah]

Answer / Jawapan :

(a)

(b)

16



- 17 Solve the equation  $\cos 2\theta = \cos \theta$  for  $0 \leq \theta \leq 2\pi$ .  
Give your answer in terms of  $\pi$ .

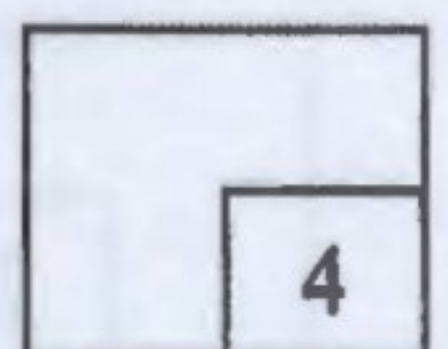
*Selesaikan persamaan  $\cos 2\theta = \cos \theta$  untuk  $0 \leq \theta \leq 2\pi$ .  
Beri jawapan anda dalam sebutan  $\pi$ .*

[4 marks]  
[4 markah]

Answer / Jawapan :

For  
Examiner's  
Use

17



For  
Examiner's  
Use

- 18 Diagram 5 shows a probability distribution graph for a random variable  $X$ ,  $X \sim N(\mu, y)$ .  
Rajah 5 menunjukkan graf taburan kebarangkalian bagi suatu pembolehubah rawak  $X$ ,  $X \sim N(\mu, y)$ .

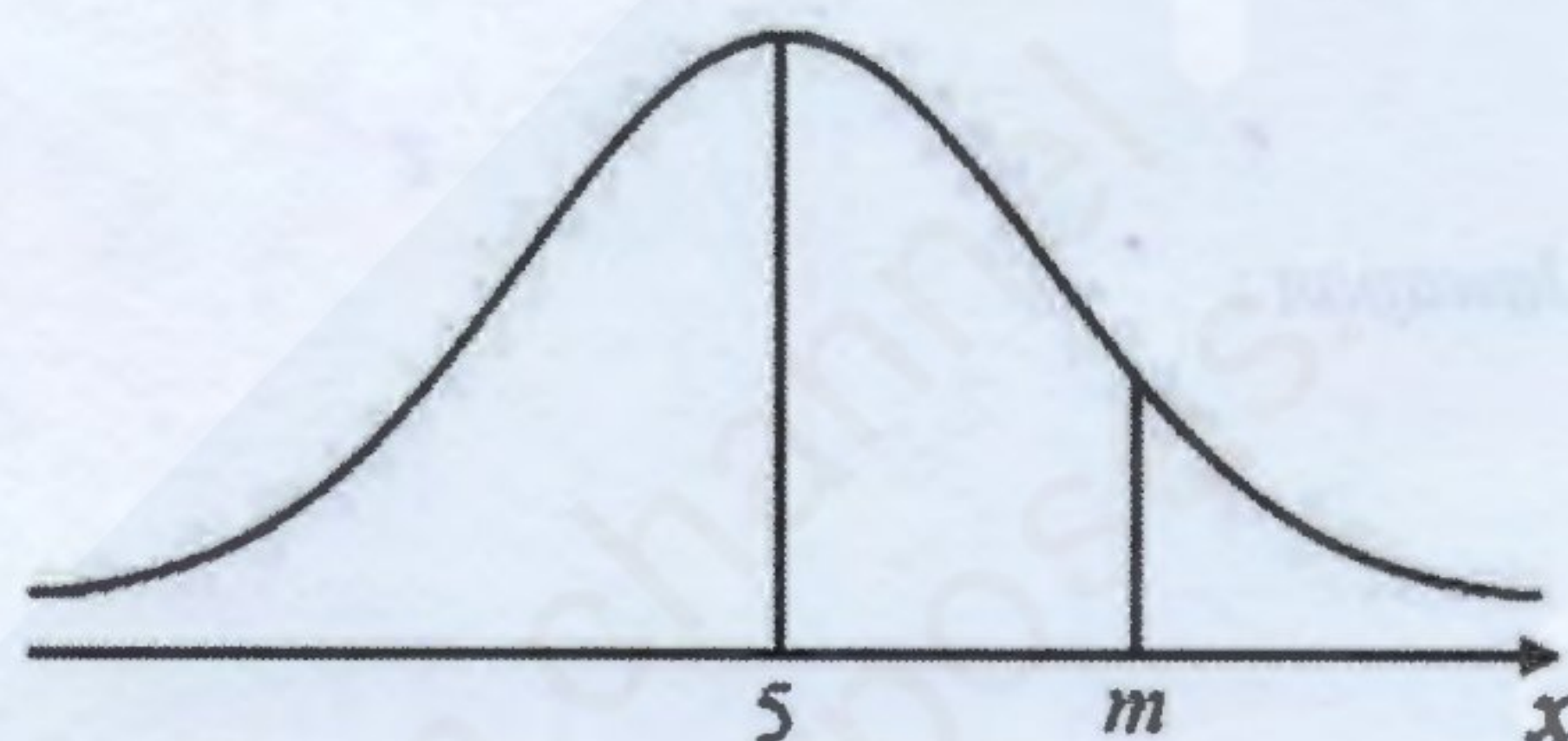


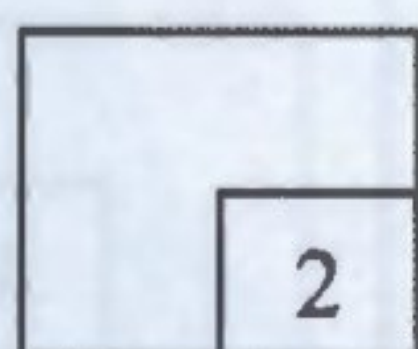
Diagram 5  
Rajah 5

Given the z-score of  $m$  is  $K$ . Express  $y$  in terms of  $m$  and of  $K$ .  
Diberi skor-z bagi  $m$  ialah  $K$ . Ungkapkan  $y$  dalam sebutan  $m$  dan  $K$ .

[2 marks]  
[2 markah]

Answer / Jawapan :

18



- 19 Diagram 6 shows a graph of probability distribution of random variable  $X$  such that  $X \sim B(3, p)$ .

For  
Examiner's  
Use

Rajah 6 menunjukkan graf taburan kebarangkalian bagi pembolehubah rawak  $X$  dengan keadaan  $X \sim B(3, p)$ .

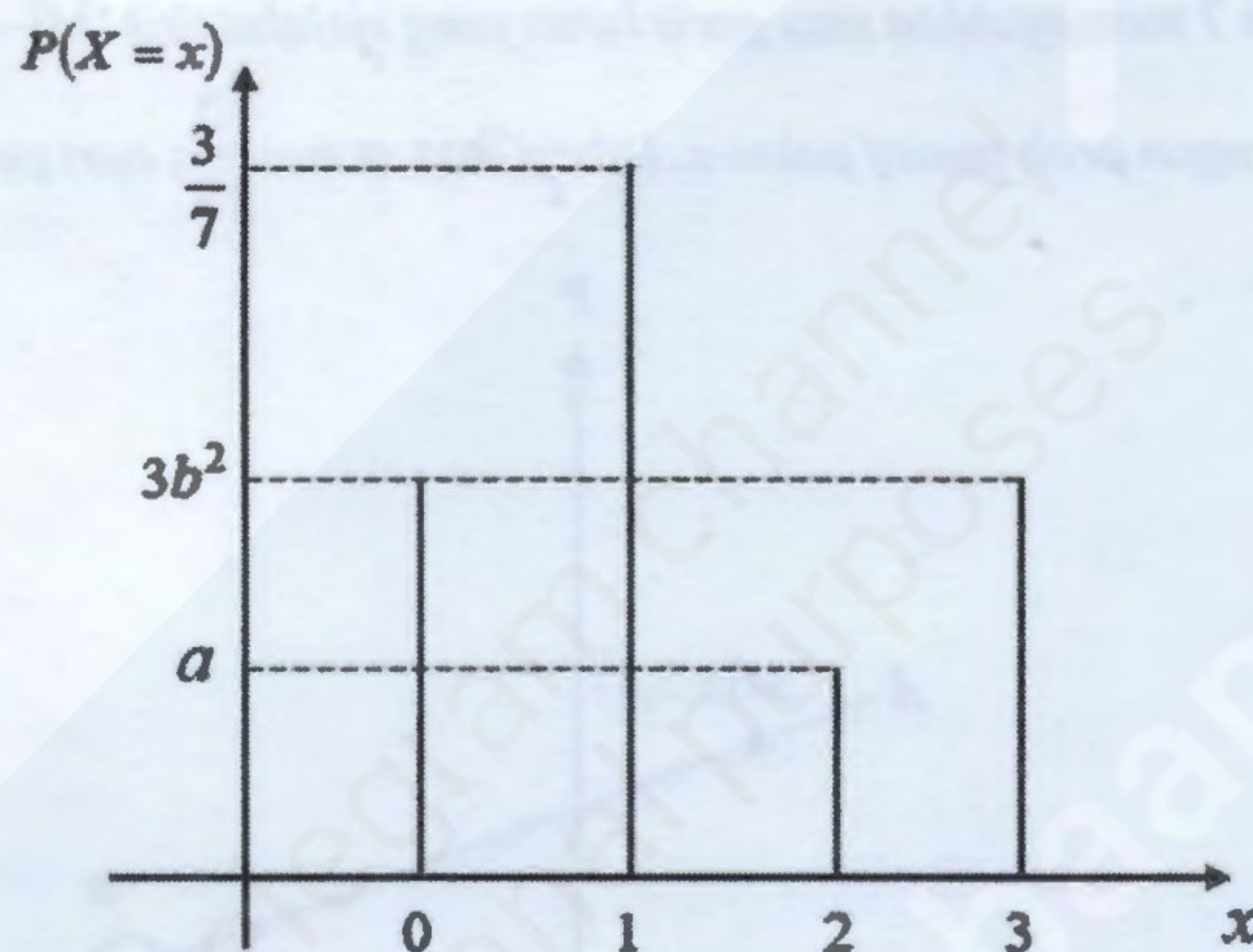


Diagram 6  
Rajah 6

- (a) Express  $b$  in terms of  $a$ .  
*Ungkapkan  $b$  dalam sebutan  $a$ .*
- (b) Find  $P(X \geq 1)$  and give your answer in terms of  $b$ .  
*Cari  $P(X \geq 1)$  dan beri jawapan anda dalam sebutan  $b$ .*

[4 marks]

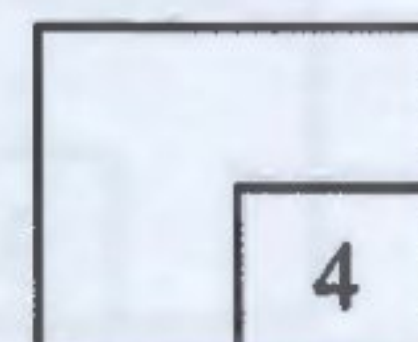
[4 markah]

Answer / Jawapan :

(a)

(b)

19



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For  
Examiner's  
Use

- 20 Diagram 7 shows a straight line that passes through point  $M(-2,3)$  and makes an angle  $\alpha$  from the positive  $x$ -axis. Using  $\cos \alpha = -\frac{12}{13}$ , find the equation of the straight line  $AB$ .

Rajah 7 menunjukkan satu garis lurus yang melalui titik  $M(-2,3)$  dan membuat sudut  $\alpha$  dengan arah positif paksi- $x$ . Diberi  $\cos \alpha = -\frac{12}{13}$ , cari persamaan garis lurus  $AB$ .

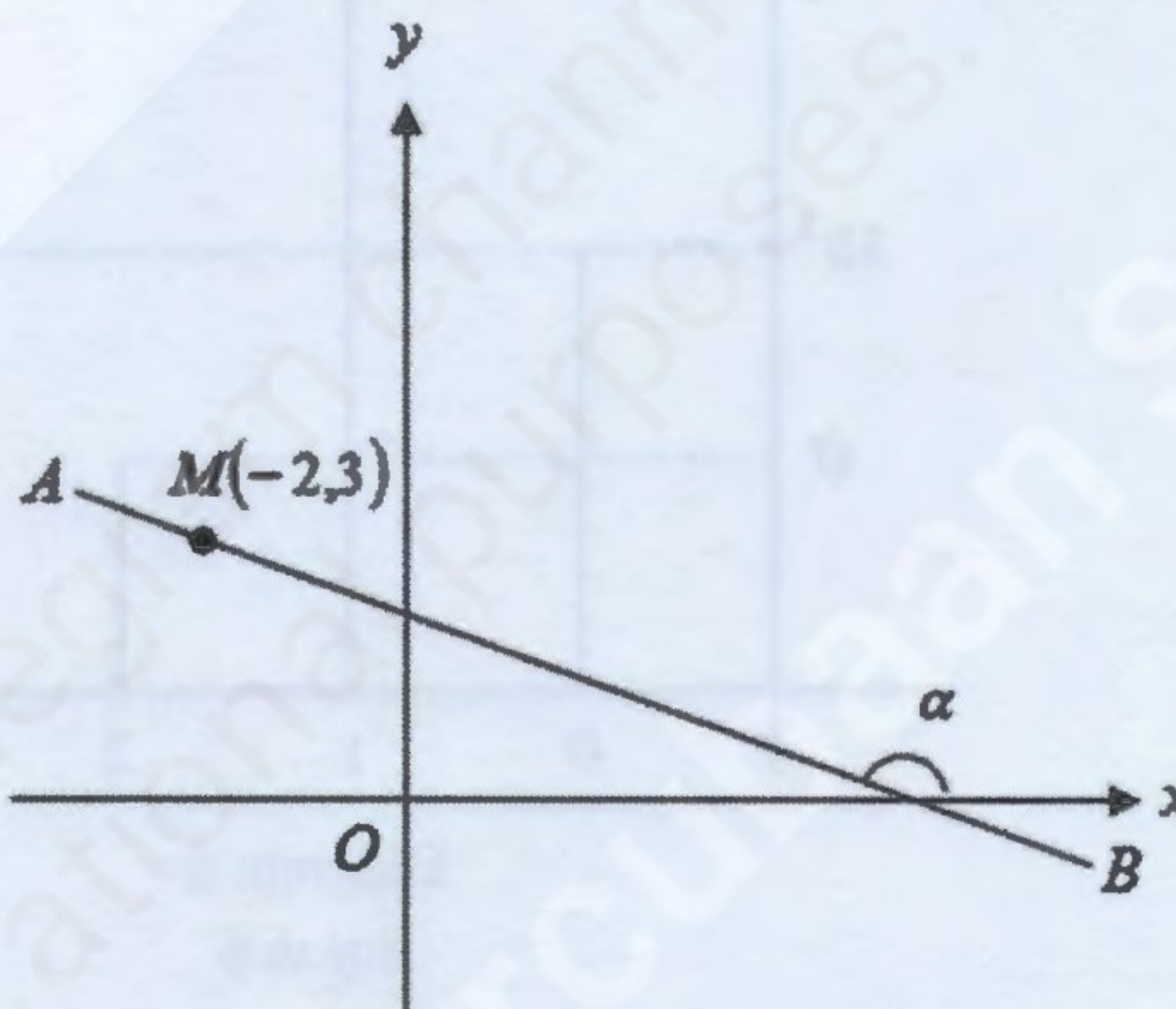
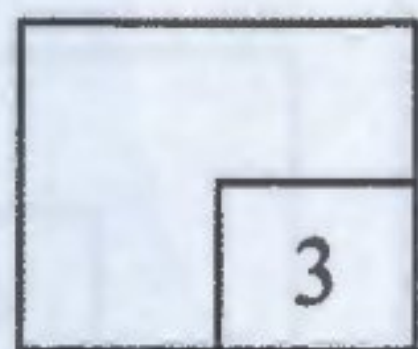


Diagram 7  
Rajah 7

[3 marks]  
[3 markah]

Answer / Jawapan :

20



- 21 Given points  $A(-2, 2)$ ,  $B(0, 4)$  and  $C(3, 7)$  are on a straight line. Point  $B$  divides the line segment  $AC$  such that  $AB = kAC$ .

For  
Examiner's  
Use

*Diberi titik-titik  $A(-2, 2)$ ,  $B(0, 4)$  dan  $C(3, 7)$  terletak pada satu garis lurus. Titik  $B$  membahagi tembereng garis  $AC$  dengan keadaan  $AB = kAC$ .*

Find the value of  $k$  and state the ratio of  $AB : BC$ .

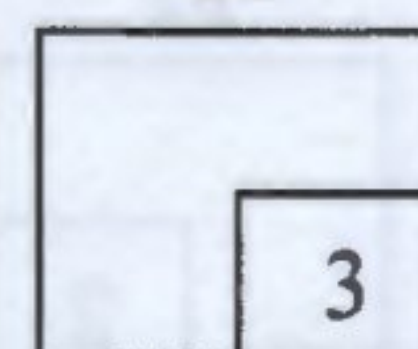
*Cari nilai bagi  $k$  dan nyatakan nisbah bagi  $AB : BC$ .*

[3 marks]

[3 markah]

Answer / Jawapan :

21



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SULIT

For .  
Examiner's  
Use

22

Given  $r = \begin{pmatrix} 3n-2 \\ 5 \end{pmatrix}$  and  $s = \begin{pmatrix} m-1 \\ 15 \end{pmatrix}$ , express  $m$  in terms of  $n$  such that  $4r + s$  is parallel to the  $y$ -axis.

Diberi  $r = \begin{pmatrix} 3n-2 \\ 5 \end{pmatrix}$  dan  $s = \begin{pmatrix} m-1 \\ 15 \end{pmatrix}$ , ungkapkan  $m$  dalam sebutan  $n$  dengan keadaan  $4r + s$  adalah selari dengan paksi- $y$ .

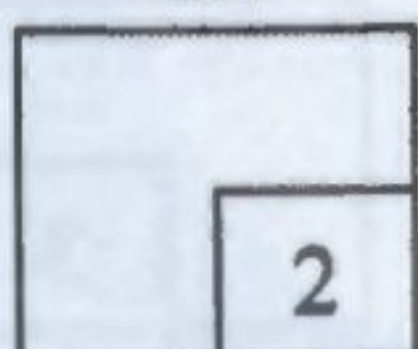
[2 marks]

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[2 markah]

Answer / Jawapan :

22



- 23 Diagram 8 shows the position of two sailboats,  $A$  and  $B$  and jetty  $Q$ .  
*Rajah 8 menunjukkan kedudukan dua buah perahu layar,  $A$  dan  $B$  dan jeti  $Q$ .*

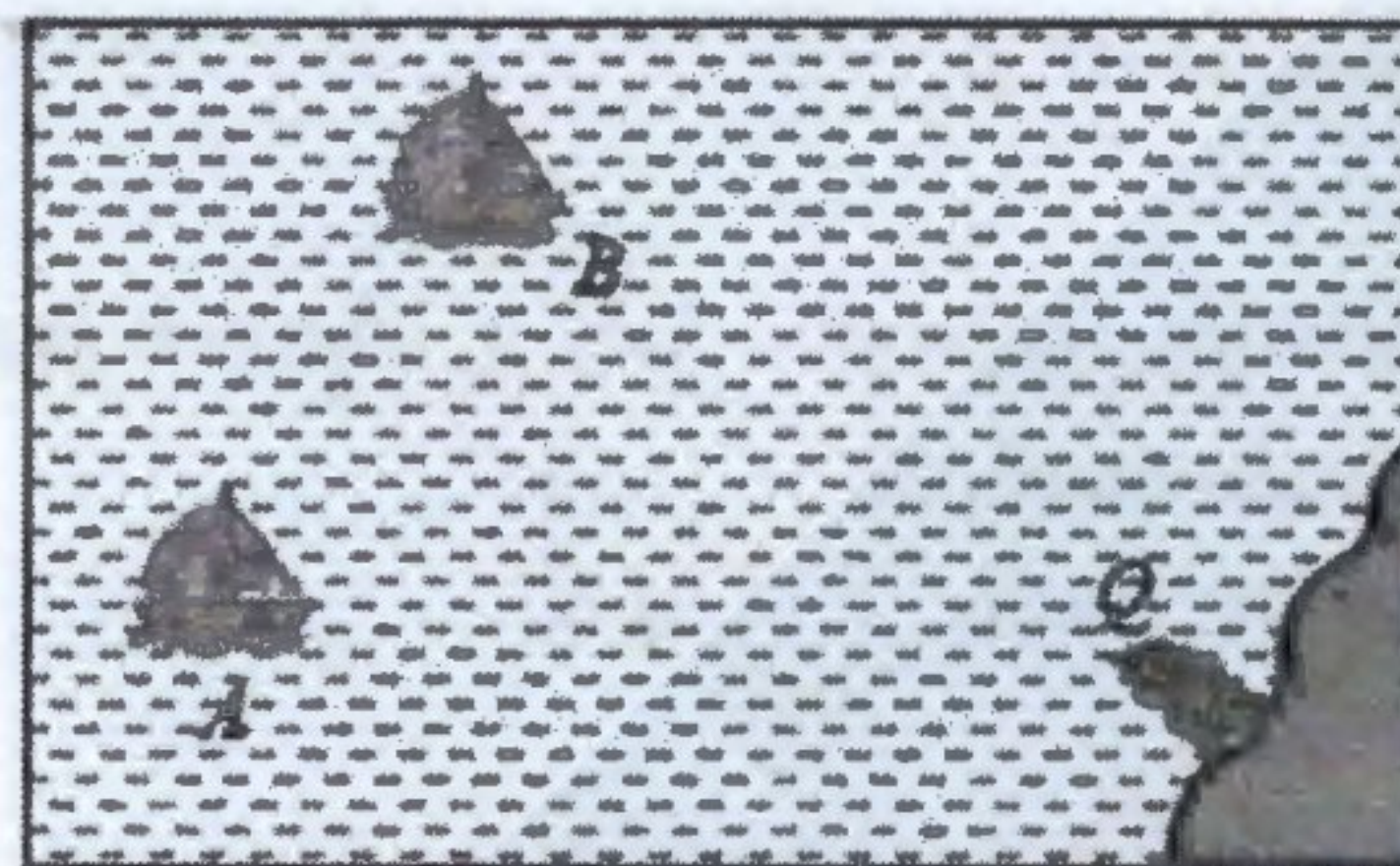


Diagram 8  
*Rajah 8*

Sailboat  $A$  is situated 450 m from jetty  $Q$  and sailboat  $B$  is situated 200 m from jetty  $Q$ .

*Perahu layar  $A$  berada 450 m dari jeti  $Q$  dan perahu layar  $B$  berada 200 m dari jeti  $Q$ .*

- (a) By using  $\underline{u}$  to represent 50 m in direction of  $QB$ , and  $\underline{v}$  to represent 100 m in direction of  $QA$ , express  $\overline{AB}$  in terms of  $\underline{u}$  and  $\underline{v}$ .

*Dengan menggunakan  $\underline{u}$  untuk mewakili 50 m pada arah  $QB$ , dan  $\underline{v}$  untuk mewakili 100 m pada arah  $QA$ , ungkapkan  $\overline{AB}$  dalam sebutan  $\underline{u}$  dan  $\underline{v}$ .*

- (b) It is given that the sailboat  $A$  and  $B$  have the same magnitude of  $45 \text{ kmh}^{-1}$ . If the magnitude of sailboat  $A$  is  $(26\underline{i} - k\underline{j}) \text{ kmh}^{-1}$ , find the value of  $k$  to the nearest integer where  $k > 0$ .

*Diberi perahu layar  $A$  dan  $B$  mempunyai magnitud yang sama iaitu  $45 \text{ kmh}^{-1}$ . Jika magnitud perahu layar  $A$  ialah  $(26\underline{i} - k\underline{j}) \text{ kmh}^{-1}$ , cari nilai  $k$  kepada integer terdekat di mana  $k > 0$ .*

[4 marks]

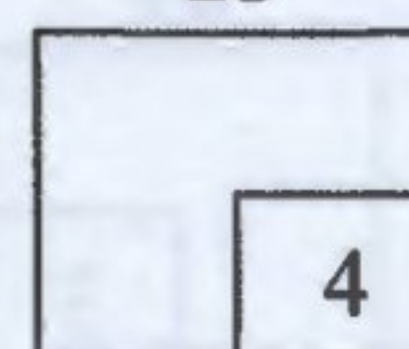
[4 markah]

Answer / Jawapan :

(a)

(b)

23



[Lihat halaman sebelah  
 SULIT]

For  
Examiner's  
Use

- 24 Given the quadratic function  $f(x) = x^2 - 2x + p$ , where  $p$  is a constant, is always greater than 3.  
Find the smallest integer of  $p$ .

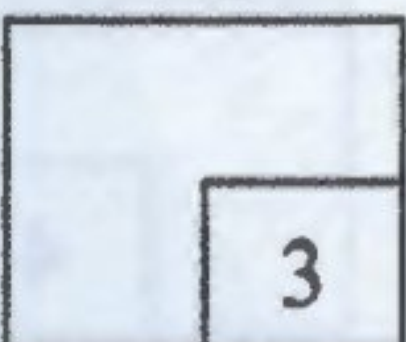
*Diberi fungsi kuadratik  $f(x) = x^2 - 2x + p$ , dengan keadaan  $p$  ialah pemalar, adalah sentiasa lebih besar daripada 3.  
Cari nilai  $p$  yang paling kecil.*

[3 marks]

[3 markah]

Answer / Jawapan :

24



For  
Examiner's  
Use

25. The equation of the curve  $y = 2x^2 + ax + 12$  can be expressed in the form of  $y = 2(x - 3)^2 + b$ , where  $a$  and  $b$  are constants.

*Persamaan suatu lengkung  $y = 2x^2 + ax + 12$  boleh diungkapkan dalam bentuk  $y = 2(x - 3)^2 + b$  dengan keadaan  $a$  dan  $b$  ialah pemalar.*

- (a) Find the value of  $a$  and of  $b$ .  
*Cari nilai  $a$  dan nilai  $b$ .*
- (b) Hence, find the minimum value of  $y$ .  
*Seterusnya, cari nilai minimum bagi  $y$ .*

[3 marks]  
[3 markah]

Answer / Jawapan :

(a)

(b)

END OF QUESTION PAPER  
KERTAS PEPERIKSAAN TAMAT

