

3472/1

MATEMATIK

TAMBAHAN

KERTAS 1

2 JAM

NAMA: .....

TINGKATAN: .....



**MAJLIS PENGETUA SEKOLAH MALAYSIA (MPSM)  
NEGERI PERAK**

**MODUL KECEMERLANGAN SPM 2023  
SET 2**

**MATEMATIK TAMBAHAN**

KERTAS 1

2 JAM

**JANGAN BUKA KERTAS PEPERIKSAAN INI SEHINGGA DIBERITAHU**

1. *Tulis nama dan kelas anda pada ruangan yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan dalam Bahasa Melayu mendahului soalan yang sepadan dalam Bahasa Inggeris.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam Bahasa Melayu atau Bahasa Inggeris.*

<i>Untuk Kegunaan Pemeriksa</i>			
Bahagian	Soalan	Markah Penuh	Markah Diperoleh
<b>A</b>	1	4	
	2	6	
	3	8	
	4	4	
	5	5	
	6	5	
	7	7	
	8	4	
	9	6	
	10	4	
	11	5	
	12	6	
<b>B</b>	13	8	
	14	8	
	15	8	
<b>Jumlah</b>		80	

## SENARAI RUMUS

- 1  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
- 2  $a^m \times a^n = a^{m+n}$
- 3  $a^m \div a^n = a^{m-n}$
- 4  $(a^m)^n = a^{mn}$
- 5  $\log_a mn = \log_a m + \log_a n$
- 6  $\log_a \frac{m}{n} = \log_a m - \log_a n$
- 7  $\log_a m^n = n \log_a m$
- 8  $\log_a b = \frac{\log_c b}{\log_c a}$
- 9  $T_n = a + (n-1)d$
- 10  $T_n = ar^{n-1}$
- 11  $S_n = \frac{n}{2}[2a + (n-1)d]$
- 12  $S_n = \frac{a(r^n - 1)}{r - 1} = \frac{a(1 - r^n)}{1 - r}, r \neq 1$
- 13  $S_\infty = \frac{a}{1 - r}, |r| < 1$
- 14  $y = uv, \frac{dy}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$
- 15  $y = \frac{u}{v}, \frac{dy}{dx} = \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v^2}$
- 16  $\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$
- 17 Luas di bawah lengkung  
*Area under a curve*  
 $\int_a^b x dy$  atau (or)  $\int_a^b y dx$
- 18 Isi padu kisanan  
*Volume of revolution*  
 $\int_a^b \pi y^2 dx$  atau (or)  $\int_a^b \pi x^2 dy$
- 19  $I = \frac{Q_1}{Q_0} \times 100$
- 20  $\bar{I} = \frac{\sum W_i I_i}{\sum W_i}$
- 21  ${}^n P_r = \frac{n!}{(n-r)!}$
- 22  ${}^n C_r = \frac{n!}{(n-r)! r!}$
- 23  $P(X = r) = {}^n C_r p^r q^{n-r}, p + q = 1$
- 24 Min / Mean,  $\mu = np$
- 25  $\sigma = \sqrt{npq}$
- 26  $Z = \frac{X - \mu}{\sigma}$
- 27 Panjang lengkok,  $s = j\theta$   
*Arc length,  $s = r\theta$*
- 28 Luas sektor,  $L = \frac{1}{2} j^2 \theta$   
*Area of sector,  $A = \frac{1}{2} r^2 \theta$*
- 29  $\sin^2 A + \cos^2 A = 1$   
 $\sin^2 A + \cos^2 A = 1$
- 30  $\sec^2 A = 1 + \tan^2 A$   
 $\sec^2 A = 1 + \tan^2 A$
- 31  $\csc^2 A = 1 + \cot^2 A$   
 $\csc^2 A = 1 + \cot^2 A$
- 32  $\sin 2A = 2 \sin A \cos A$   
 $\sin 2A = 2 \sin A \cos A$

$$\begin{aligned}
 33 \quad \cos 2A &= \cos^2 A - \sin^2 A \\
 &= 2 \cos^2 A - 1 \\
 &= 1 - 2 \sin^2 A
 \end{aligned}$$

$$\begin{aligned}
 \cos 2A &= \cos^2 A - \sin^2 A \\
 &= 2 \cos^2 A - 1 \\
 &= 1 - 2 \sin^2 A
 \end{aligned}$$

$$34 \quad \tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$$

$$\begin{aligned}
 35 \quad \sin (A \pm B) &= \sin A \cos B \pm \cos A \sin B \\
 \sin (A \pm B) &= \sin A \cos B \pm \cos A \sin B
 \end{aligned}$$

$$\begin{aligned}
 36 \quad \cos (A \pm B) &= \cos A \cos B \mp \sin A \sin B \\
 \cos (A \pm B) &= \cos A \cos B \mp \sin A \sin B
 \end{aligned}$$

$$37 \quad \tan (A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

$$38 \quad \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\begin{aligned}
 39 \quad a^2 &= b^2 + c^2 - 2bc \cos A \\
 a^2 &= b^2 + c^2 - 2bc \cos A
 \end{aligned}$$

40 Luas segi tiga / Area of triangle

$$= \frac{1}{2} ab \sin C$$

41 Titik yang membahagi suatu tembereng garis  
A point dividing a segment of a line

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

42 Luas segi tiga / Area of triangle

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

$$43 \quad |\mathbf{r}| = \sqrt{x^2 + y^2}$$

$$44 \quad \hat{\mathbf{r}} = \frac{x\mathbf{i} + y\mathbf{j}}{\sqrt{x^2 + y^2}}$$

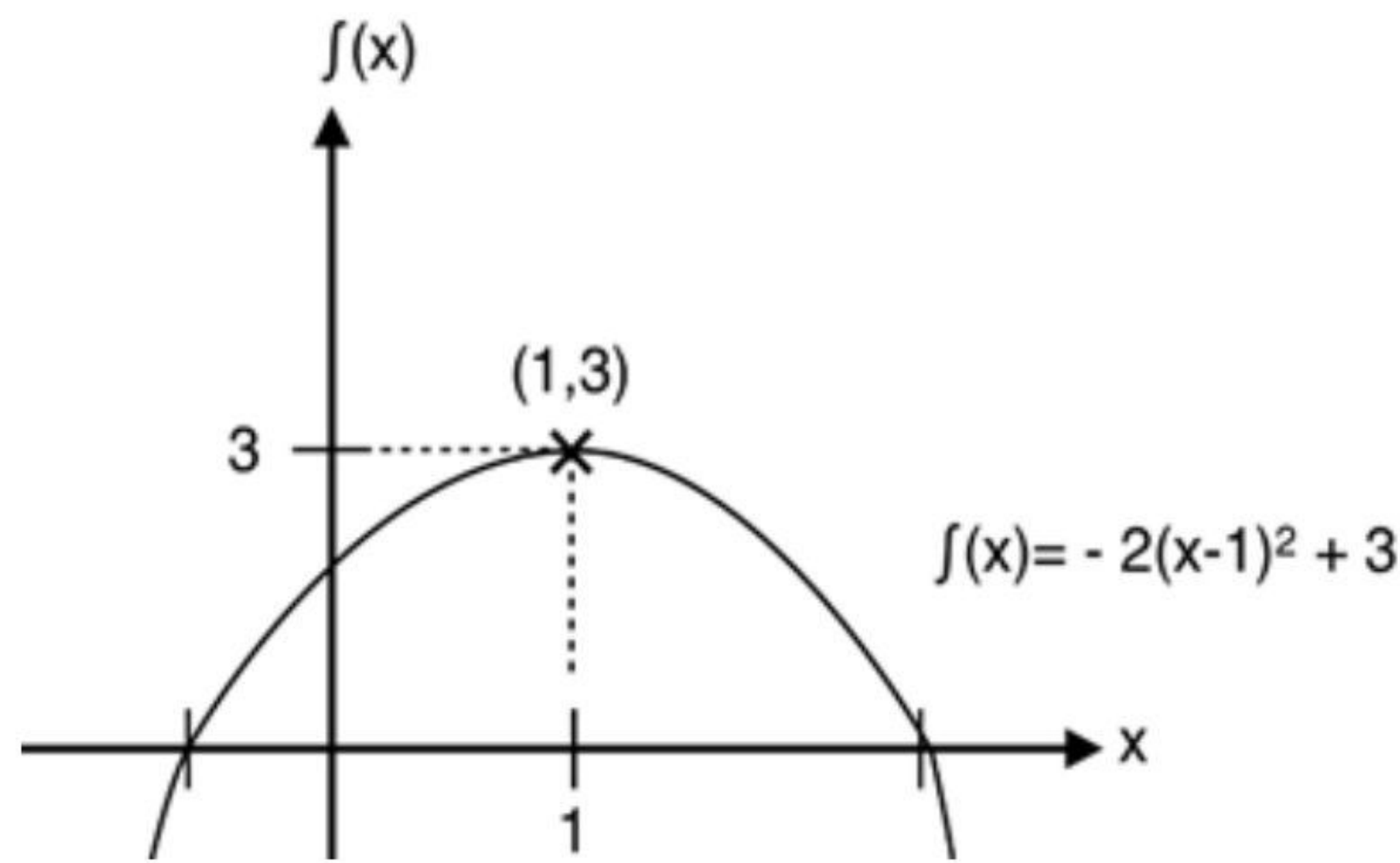
**Bahagian A****Section A**

[64 markah]

[64 marks]

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

- 1 Rajah 1 di bawah menunjukkan graf bagi  $f(x) = -2(x-1)^2 + 3$  dengan  $a = -2$ ,  $h = 1$  dan  $k = 3$ .  
Diagram 1 below shows the graph for  $f(x) = -2(x-1)^2 + 3$   $a = -2$ ,  $h = 1$  and  $k = 3$ .



Rajah 1 / Diagram 1

Buat generalisasi terhadap bentuk dan kedudukan graf apabila nilai-nilai berikut berubah :

Make a generalisation from the changes in the shape and position of the graphs when the following values change :

- (i) nilai  $a$  berubah kepada  $-6$ ,  
the value of  $a$  changes to  $-6$ ,
- (ii) nilai  $h$  berubah kepada  $4$ ,  
the value of  $h$  changes to  $4$ ,
- (iii) nilai  $k$  berubah kepada  $-1$ .  
the value of  $k$  changes to  $-1$ .

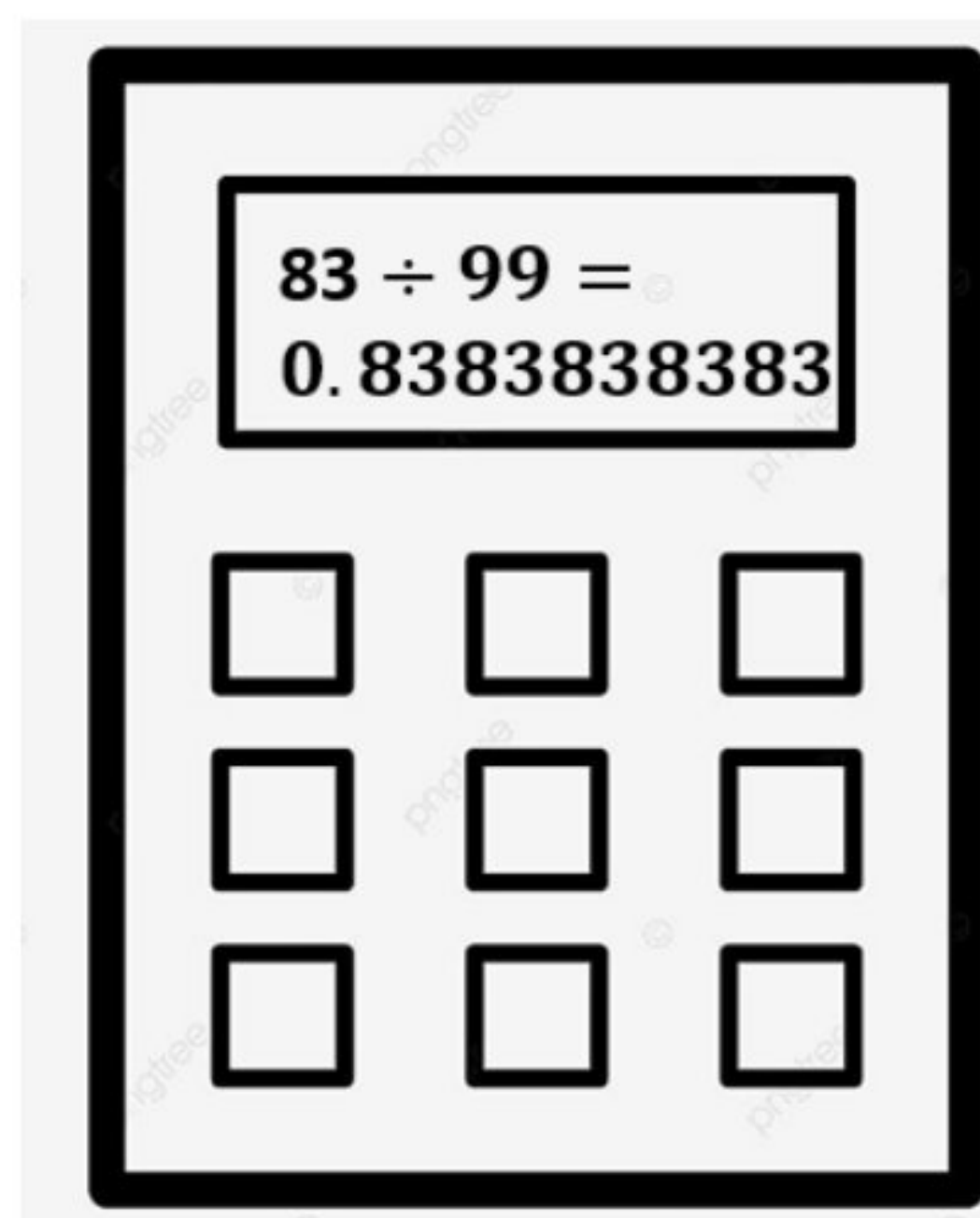
[4 markah]

[4 marks]

Jawapan / Answer :

**Ruangan Jawapan Soalan 1 / Answer Space For Question 1**

2.



Rajah 2(i)  
Diagram 2(i)

Zila: Cikgu, apakah istilah nombor yang sesuai digunakan bagi nombor pada paparan kalkulator di sebelah

Cikgu Kamal: Ada sesiapa boleh bantu untuk menjawab soalan Zila tersebut?

*Zila: Teacher, what is the suitable number terms that display on the calculator.*

*Teacher Kamal: Can anyone help to answer Zila's question?*

Rajah 2(ii)  
Diagram 2(ii)

Rajah 2(i) menunjukkan paparan kalkulator Zila. Maklumat ini boleh ditulis dalam bentuk:  
*Diagram 2(i) shows the display of the Zila calculator. This information can be written in the form:*

$$\frac{N}{M} = \frac{83}{99} = 0.8383838383$$

- (a) Buktikan bahawa nilai N dan M adalah seperti yang tertera, tunjukkan jalan kerja anda.  
*Prove that the values of N and M are as stated, show your working.*

[5 markah]  
[5 marks]

- (b) Rajah 2(ii) menunjukkan perbualan Cikgu Kamal dan Zila. Bantu Zila untuk menjawab soalan tersebut.  
*Diagram 2(ii) shows the conversation between Cikgu Kamal and Zila. Help Zila to answer the question.*

[1 markah]  
[1 mark]

**Jawapan / Answer :**

**Ruangan Jawapan Soalan 2 / Answer Space For Question 2**

3 (a) Cari  $\frac{dy}{dx}$  dengan menggunakan prinsip pertama bagi  $y = \frac{2}{x}$

Find  $\frac{dy}{dx}$  by using first principles for  $y = \frac{2}{x}$

[4 markah]

[4 marks]

(b) Diberi bahawa  $y = \sqrt{x}$ , cari

Given  $y = \sqrt{x}$ , find

(i) nilai  $\frac{dy}{dx}$  apabila  $x = 16$   
the value of  $\frac{dy}{dx}$  when  $x = 16$

(ii) nilai hampir bagi  $\sqrt{16.02}$   
the approximate value of  $\sqrt{16.02}$

[4 markah]

[4 marks]

**Jawapan / Answer :**



**Ruangan Jawapan Soalan 3 / Answer Space For Question 3**

- 4 Tuliskan ungkapan surd berikut dalam ungkapan termudah.  
*Express the following surd expression in the simplest form.*

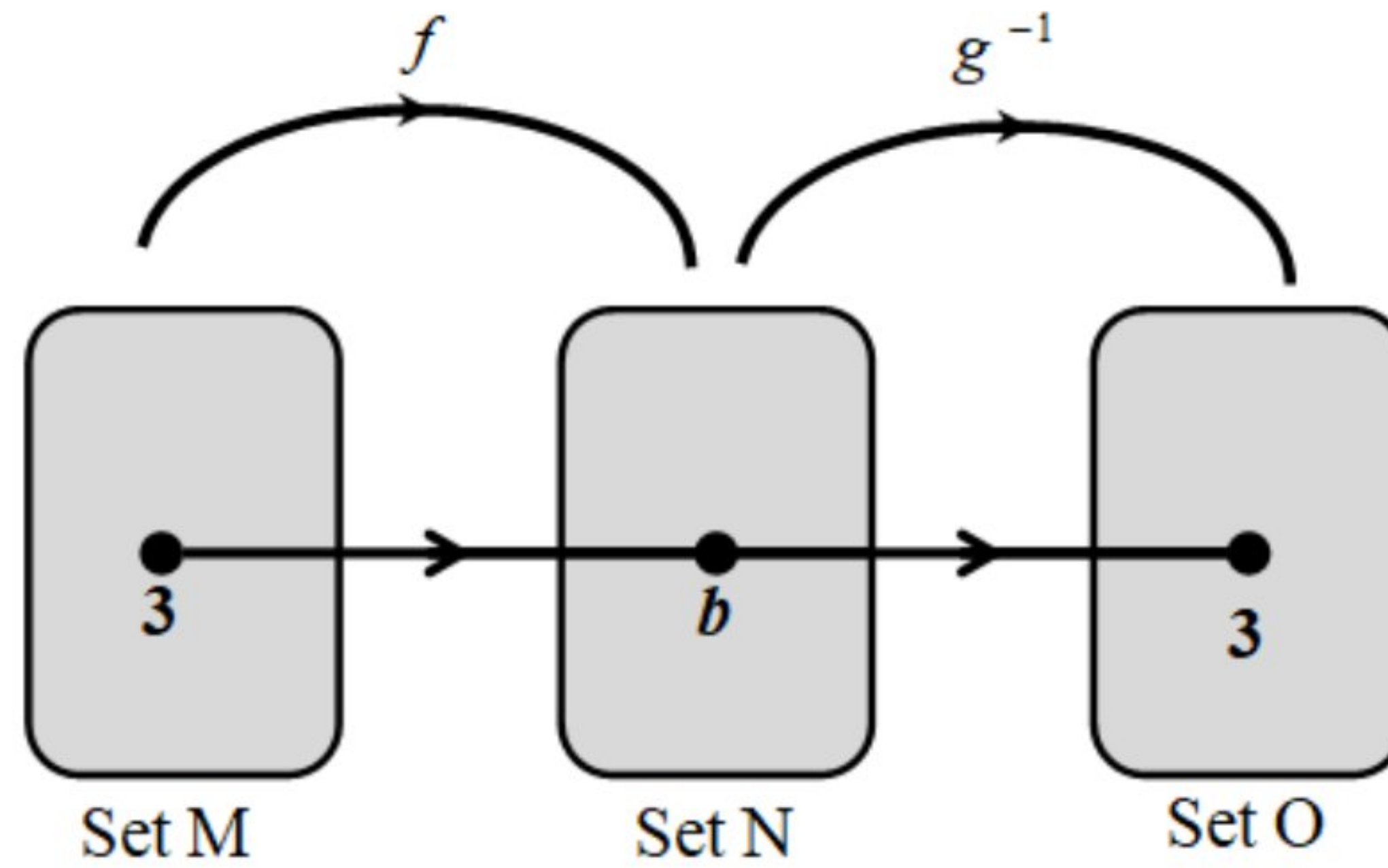
$$\frac{3 + \sqrt{5}}{\sqrt{2} + 1} + \frac{1 - \sqrt{5}}{-\sqrt{2} + 1}$$

[4 markah]

[4 marks]

**Jawapan / Answer :**

- 5 Rajah 3 di bawah menunjukkan hubungan bagi tiga set.  
Diagram 3 shows the relation of three sets.



Rajah 3 / Diagram 3

Diberi bahawa  $f(x) = \frac{3x+1}{2}$  dan  $g^{-1}f(x) = 2x-3$ .

Given that  $f(x) = \frac{3x+1}{2}$  and  $g^{-1}f(x) = 2x-3$ .

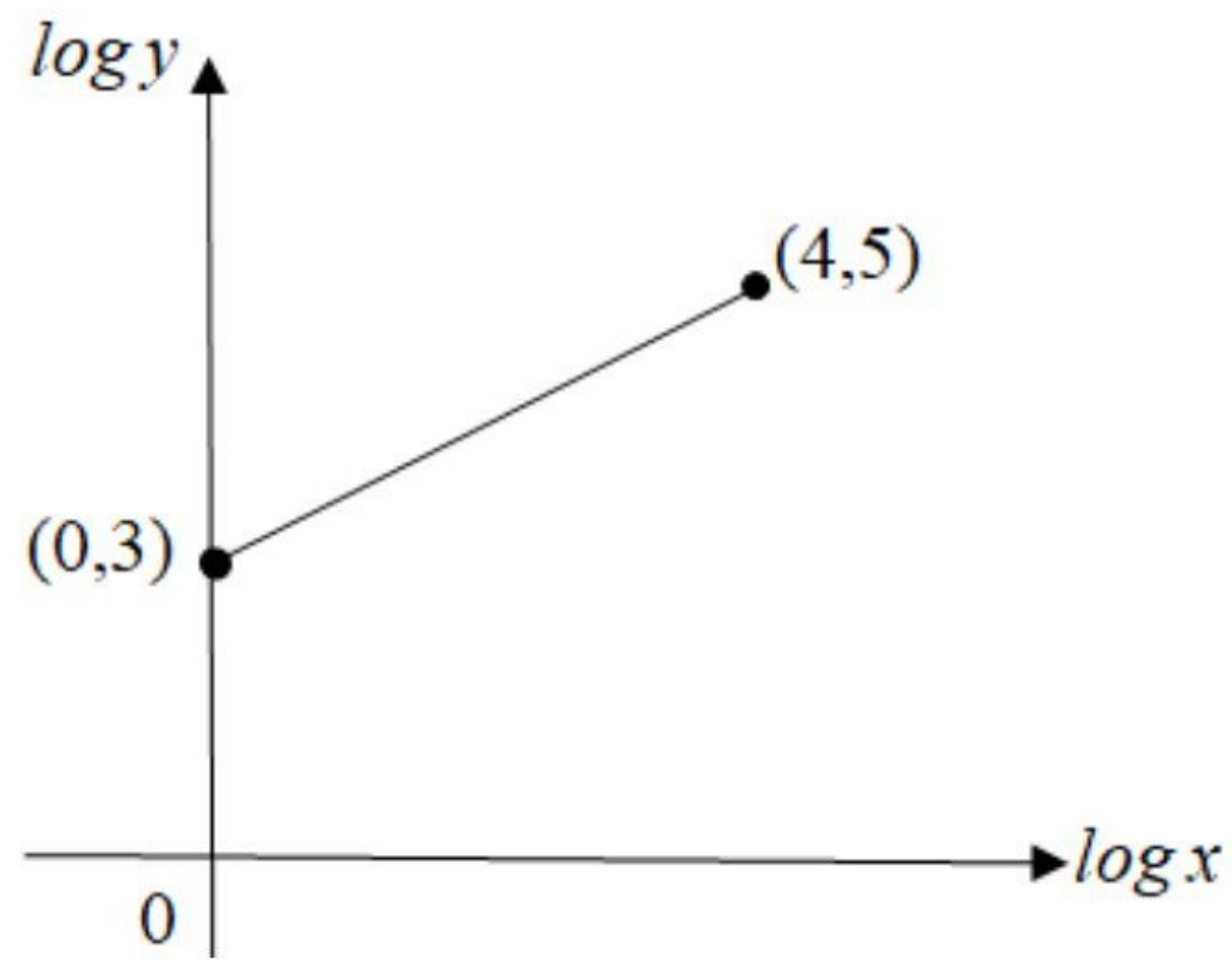
- (a) Jika seorang murid menulis  $b = 9$ , tentukan sama ada nilai itu betul atau salah. Beri sebab anda.  
If a student writes  $b = 9$ , determine whether the value is correct or wrong. Give your reason.
- (b) Cari  $g^{-1}(x)$ .  
Find  $g^{-1}(x)$ .

[5 markah]  
[5 marks]

Jawapan / Answer :

**Ruangan Jawapan Soalan 5 / Answer Space For Question 5**

- 6 Rajah 4 menunjukkan graf  $\log y$  melawan  $\log x$ .  
 Diagram 4 shows  $\log y$  against  $\log x$ .



Rajah 4 / Diagram 4

- (a) Ungkapkan  $y$  dalam sebutan  $x$   
 Express  $y$  in terms of  $x$ .

[3 markah]

[3 marks]

- (b) Carikan nilai  $y$  apabila  $x = 0.01$ .  
 Find the value of  $y$  when  $x = 0.01$ .

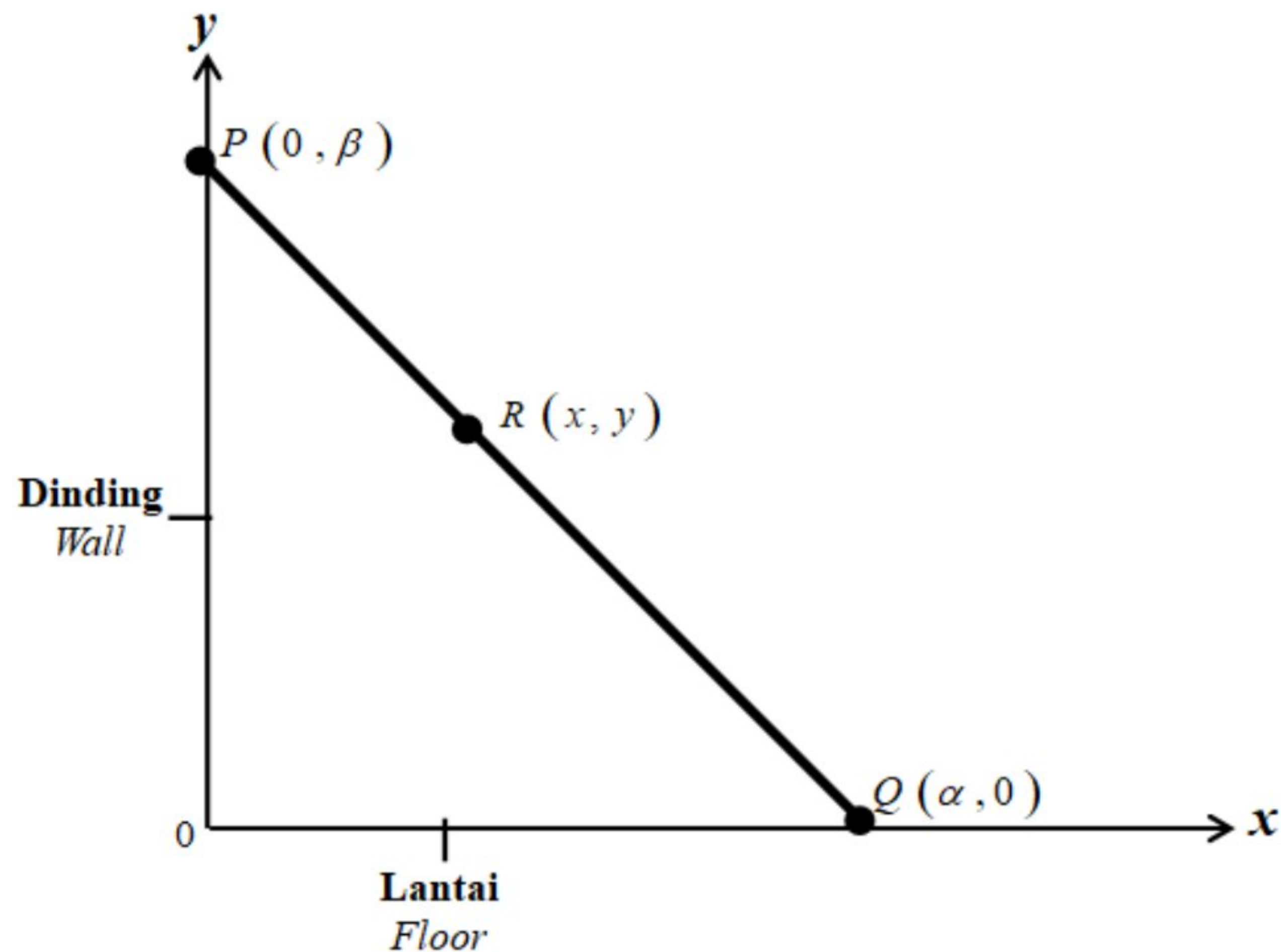
[2 markah]

[2 marks]

**Jawapan / Answer :**

- 7 Rajah 5 menunjukkan paksi-x dan paksi-y yang mewakili lantai dan dinding di rumah En. Razid. Hujung sebatang kayu  $PQ$  yang panjangnya 9 m menyentuh dinding dan lantai itu pada titik  $P(0, \beta)$  dan  $Q(\alpha, 0)$ .

Figure 5 shows the x-axis and y-axis representing the floor and wall in Mr. Razid. The ends of a stick  $PQ$  of length 9 m touch the wall and the floor at points  $P(0, \beta)$  and  $Q(\alpha, 0)$ .



Rajah 5  
Diagram 5

- (a) (i) Tuliskan persamaan yang menghubungkan  $\alpha$  dan  $\beta$ .  
*Write the equation that connects  $\alpha$  and  $\beta$ .*
- (ii) Seterusnya, diberi  $R$  ialah satu titik pada kayu itu dengan keadaan nisbah  $PR : RQ = 1 : 2$ . Tunjukkan bahawa lokus titik  $R$  apabila hujung-hujung kayu itu menggelongsor di sepanjang paksi-x dan paksi-y ialah  $4x^2 + y^2 = 36$ .  
*Hence, given  $R$  is a point on the stick with the ratio  $PR : RQ = 1 : 2$ . Show that the locus of point  $R$  when the ends of the stick slide along the x-axis and y-axis is  $4x^2 + y^2 = 36$ .*

[5 markah]

[5 marks]

- (b) En. Razid menggantungkan sebuah lukisan di dinding berkenaan dengan kedudukan penggantung lukisan itu pada kedudukan  $(3, 6)$ . Adakah kayu yang menggelongsor itu menyentuh penggantung lukisan itu? Beri justifikasi terhadap jawapan anda.

*Mr. Razid hangs a painting on the wall with respect to the position of the painting hanger at the position  $(3, 6)$*

*Did the sliding stick touch the picture hanger? Justify your answer.*

[2 markah]

[2 marks]

**Jawapan / Answer :**

**Ruangan Jawapan Soalan 7 / Answer Space For Question 7**

- 8 Satu jangjang aritmetik 4, 7, 10, ... mempunyai tiga sebutan yang berturutan dengan keadaan hasil tambah bagi ketiga-tiga sebutan tersebut ialah 228. Nyatakan tiga sebutan yang berturutan tersebut.  
*An arithmetic progression 4, 7, 10, ... has three consecutive terms where the sum of the three terms is 228. State those three consecutive terms.*

[4 markah]  
[4 marks]

**Jawapan / Answer :**



- 9 (a) Buktikan  
*Prove that*

$${}^n P_r = ({}^n C_r)(r!)$$

[3 markah]

[3 marks]

- (b) Satu jawatan kuasa hendak dibentuk bagi menangani masalah kekurangan pelajar aliran sains. Jawatan kuasa itu mengandungi 7 ahli yang dipilih daripada 6 pensyarah, 3 pengetua, dan 2 guru.  
Hitungkan bilangan cara jawatan kuasa itu boleh dipilih jika jawatan kuasa itu mengandungi 3 atau 4 pensyarah.

*An authority is to be formed to deal with the problem of lack of students in the science stream. The authority consists of 7 members selected from 6 lecturers, 3 principals, and 2 teachers.*

*Calculate the number of ways the authority can be chosen if the authority contains 3 or 4 lecturers.*

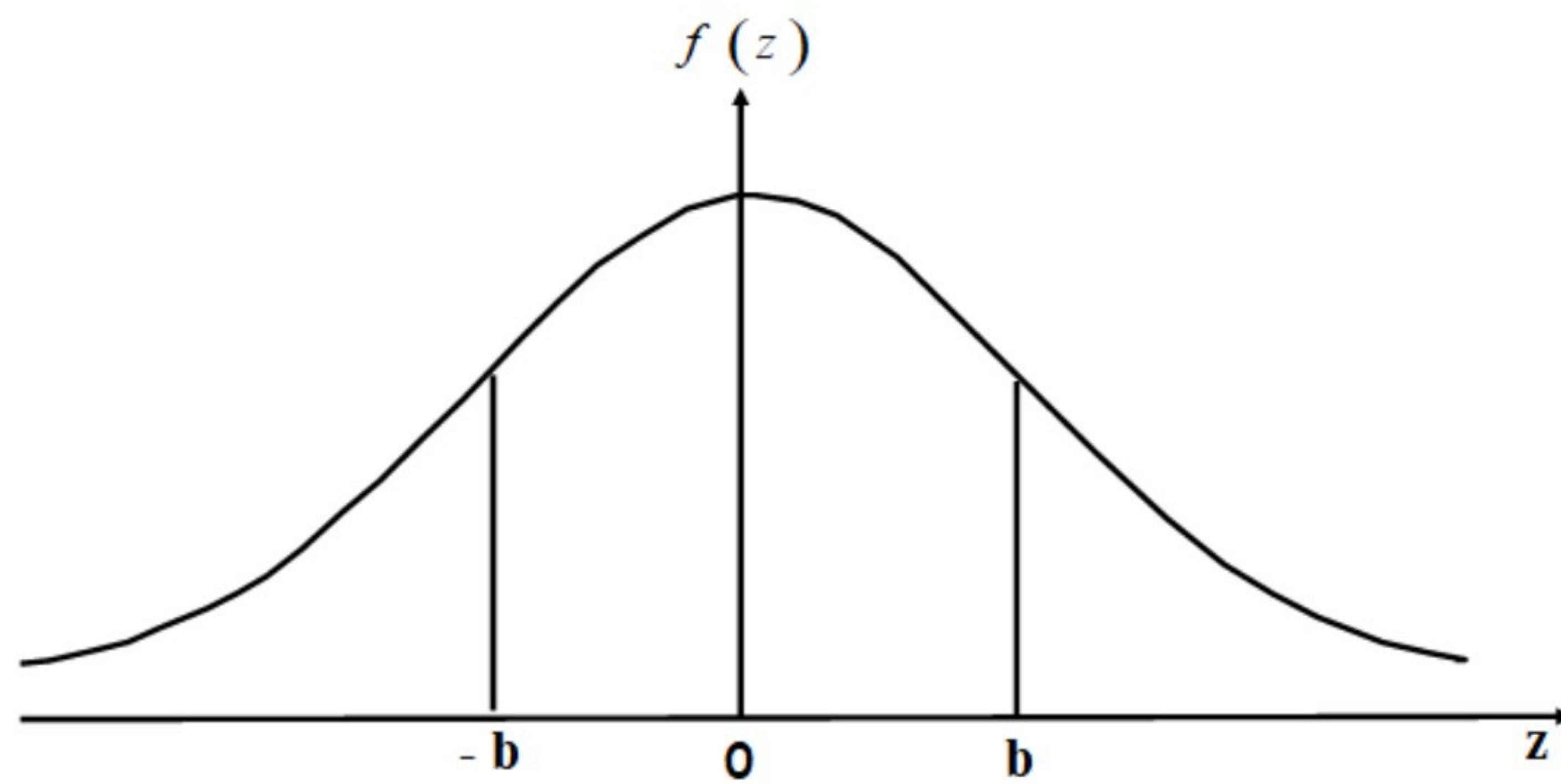
[3 markah]

[3 marks]

**Jawapan / answer :**

- 10 (a) Rajah 6(a) menunjukkan graf taburan normal piawai.

Diagram 6(a) shows the standard normal distribution graph.



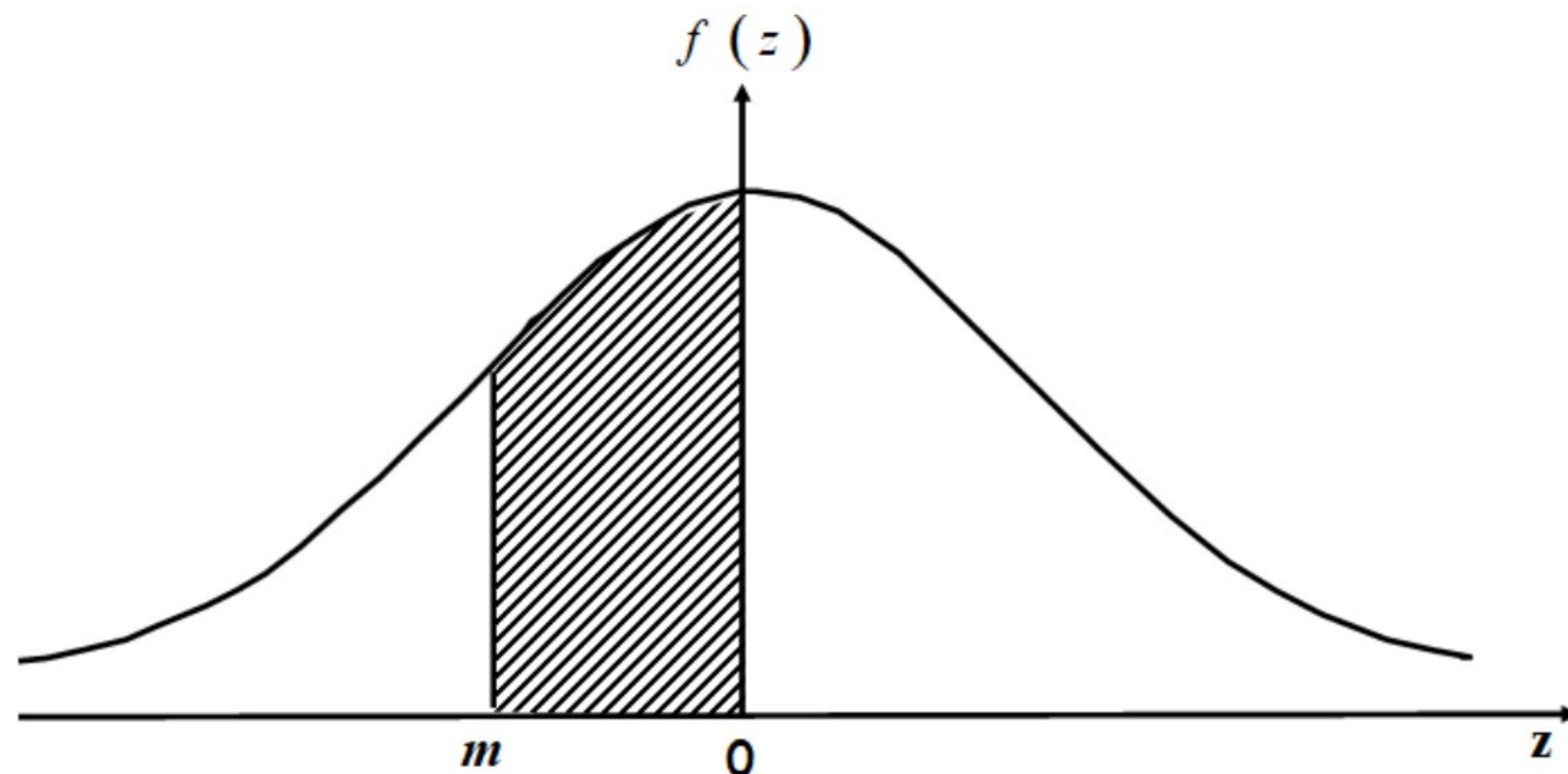
Rajah 6(a) / Diagram 6(a)

Pada Rajah 6(a), lorekkan rantau / rantau-rantau untuk mewakili  $P(|Z| \leq b)$ .

On Diagram 6(a), shade the region(s) to represent  $P(|Z| \leq b)$ .

[1 markah]  
[1 marks]

- (b) Rajah 6(b) menunjukkan graf bagi taburan normal piawai. Kebarangkalian yang diwakili oleh rantau berlorek ialah 0.3415. Cari nilai  $m$ .  
*The diagram 6(b) shows a standard normal distribution graph. The probability represented by the shaded region is 0.3415. Find the value of  $m$ .*



Rajah 6(b)  
Diagram 6(b)

[3 markah]  
[3 marks]

Jawapan / Answer :

11

Diberi  $A$  dan  $B$  adalah dua sudut dalam sukuan yang sama dan berada di antara  $0^\circ$  dan  $360^\circ$  dengan  $\cos A = \frac{8}{17}$  dan  $\tan B = -\frac{3}{4}$ . Tanpa menggunakan kalkulator, carikan

*Given that  $A$  and  $B$  are two angles which are in the same quadrant and are in between  $0^\circ$  and  $360^\circ$  such that  $\cos A = \frac{8}{17}$  and  $\tan B = -\frac{3}{4}$ . Without using a calculator, find*

(a)  $\tan (A - B)$

[3 markah]

[3 marks]

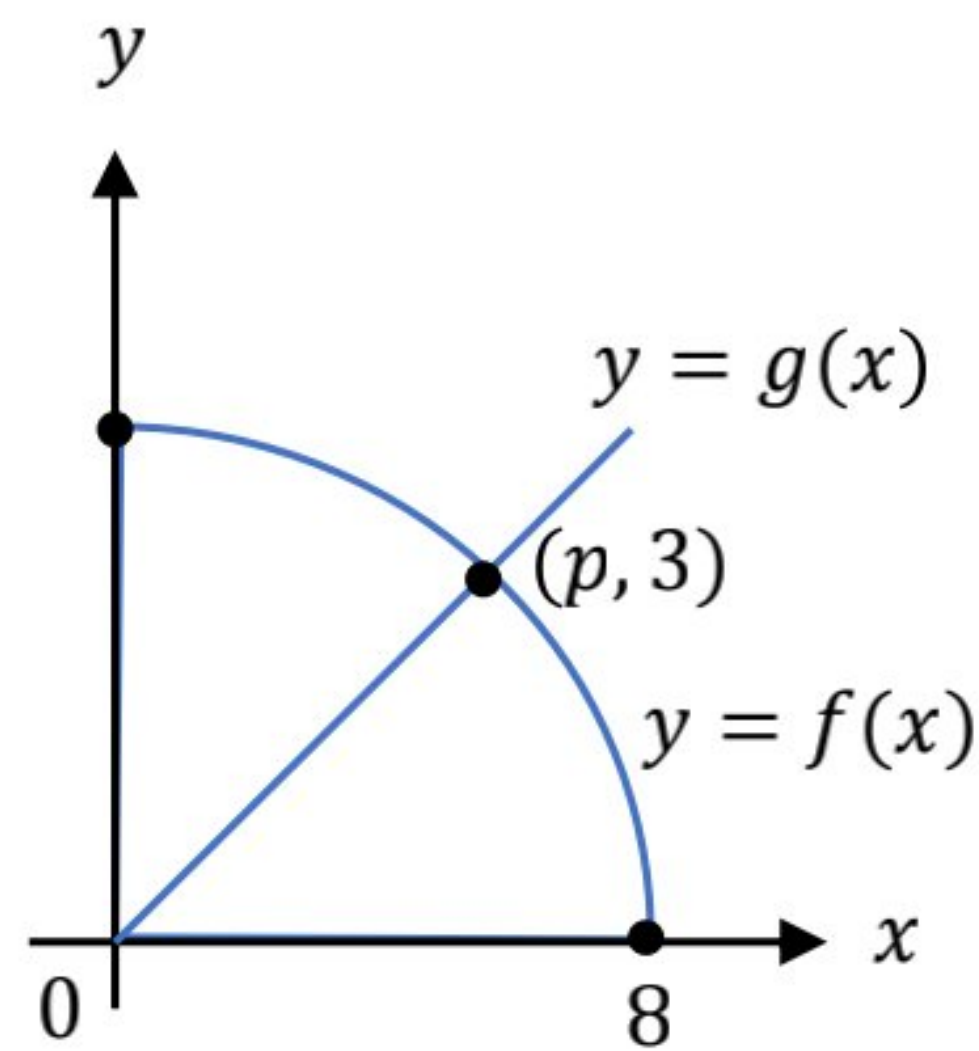
(b)  $\operatorname{cosec} \left( \frac{1}{2} A \right) / \operatorname{cosec} \left( \frac{1}{2} A \right)$

[2 markah]

[2 marks]

**Jawapan / Answer :**

- 12 Rajah 7 menunjukkan graf lengkung  $y = f(x)$  dan garis lurus  $y = g(x)$ .  
 Diagram 7 shows the curve of graph  $y = f(x)$  and a straight line  $y = g(x)$ .



Rajah 7 / Diagram 7

Diberi / Given

$$\int_0^p g(x) \, dx + \int_p^8 f(x) \, dx = 12$$

- (a) Pada rajah di atas, lorekkan rantau yang diwakili oleh  $\int_0^p g(x) \, dx + \int_p^8 f(x) \, dx = 12$ .  
 In the above diagram, shade the region represented by  $\int_0^p g(x) \, dx + \int_p^8 f(x) \, dx = 12$ .

[3 markah]

[3 marks]

- (b) Cari luas dalam sebutan  $p$  bagi  $\int_0^3 f(x) \, dy$ .  
 Find the area in terms of  $p$  for  $\int_0^3 f(x) \, dy$ .

[3 markah]

[3 marks]

Jawapan / Answer :

Ruang Jawapan Soalan 12 / Answer Space For Question 12

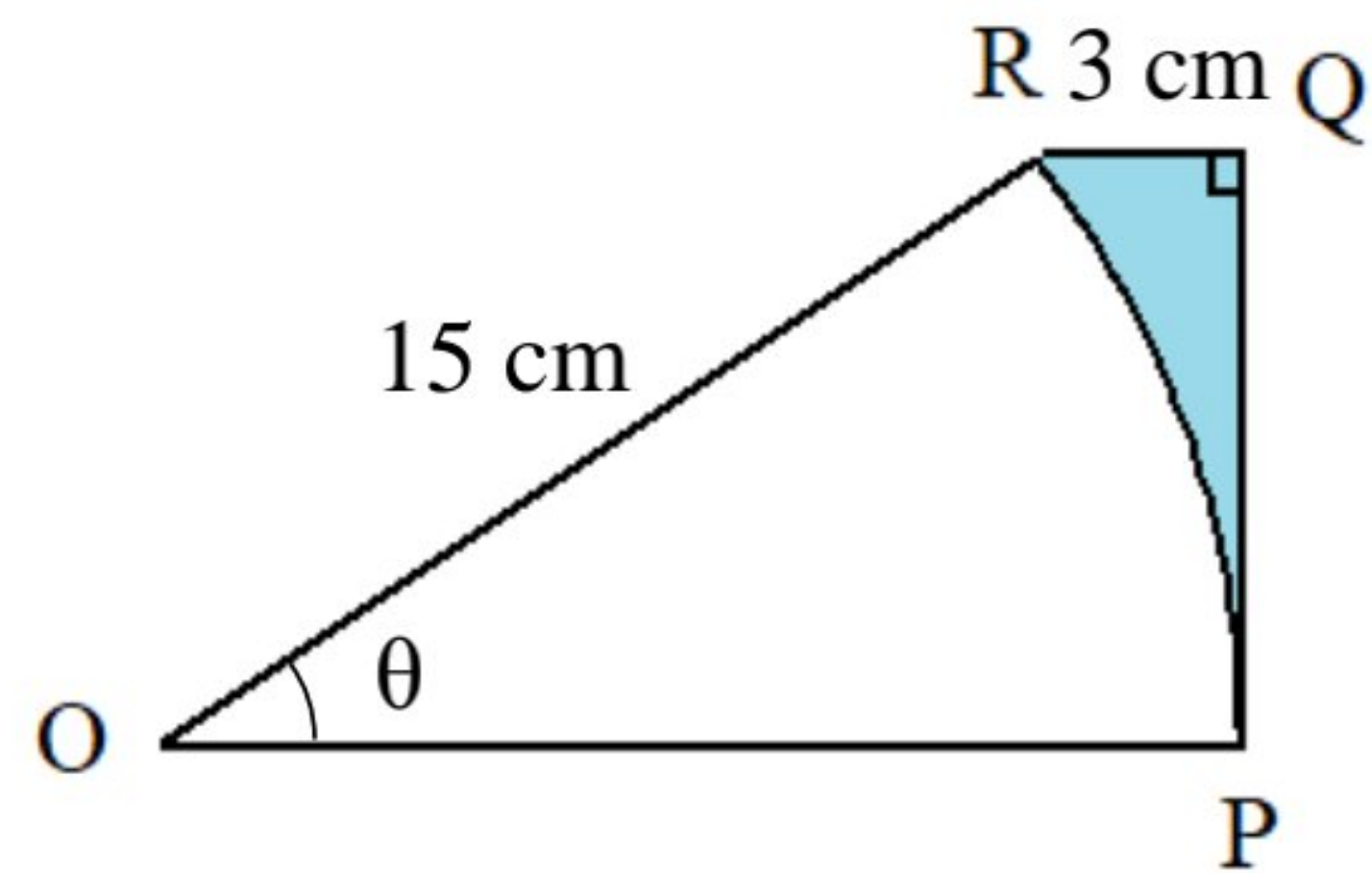


**Bahagian B****Section B**

[16 Markah]

[16 *markah*]Jawab mana-mana **dua** soalan daripada bahagian ini.*Answer any two questions from this section.*

- 13 Rajah 8 menunjukkan sektor  $OPR$  dengan pusat  $O$  di dalam sebuah trapezium  $OPQR$ .  
*Diagram 8 shows a sector  $OPR$  is enclosed in a trapezium  $OPQR$ .*  
 [Guna / Use  $\pi = 3.142$ ]



Rajah 8  
 Diagram 8

- (a) Tunjukkan bahawa  $\theta = 0.644$  radian.  
*Show that  $\theta = 0.644$  radian.*
- (b) Hitung / Calculate
- perimeter, dalam cm, kawasan berlorek,  
*the perimeter, in cm, of the shaded region,*
  - luas, dalam  $\text{cm}^2$ , kawasan berlorek itu.  
*the area of the shaded region, in  $\text{cm}^2$ .*

[2 markah]  
 [2 marks]

[6 markah]  
 [6 marks]

**Jawapan / Answer :**

**Ruangan Jawapan Soalan 13 / Answer Space For Question 13**



SOALAN GEMPUR JPN PERAK (SET 1 – KERTAS 1)

14 (a) Diberi  $\log_a 3 = x$  dan  $\log_a 5 = y$ . Ungkapkan  $\log_a \left( \frac{45}{a^3} \right)$  dalam sebutan  $x$  dan  $y$ .

Given  $\log_a 3 = x$  and  $\log_a 5 = y$ . Express  $\log_a \left( \frac{45}{a^3} \right)$  in terms of  $x$  and  $y$ .

[3 markah]

[3 marks]

(b) Dua uji kaji telah dijalankan untuk mendapatkan perhubungan antara pemboleh ubah  $x$  dan  $y$ . Persamaan  $3(9^x) = 27^y$  dan  $\log_2 y = 2 + \log_2 (x - 2)$  masing-masing diperoleh daripada uji kaji pertama dan kedua.

Cari nilai  $x$  dan nilai  $y$  yang memuaskan kedua-dua uji kaji itu.

*Two experiments were conducted to obtain the relationship between the variables  $x$  and  $y$ . Equations*

*$3(9^x) = 27^y$  and  $\log_2 y = 2 + \log_2 (x - 2)$  are obtained from the first and second experiments.*

*Find the value of  $x$  and the value of  $y$  that satisfy both tests.*

[5 markah]

[5 marks]

**Jawapan / Answer :**

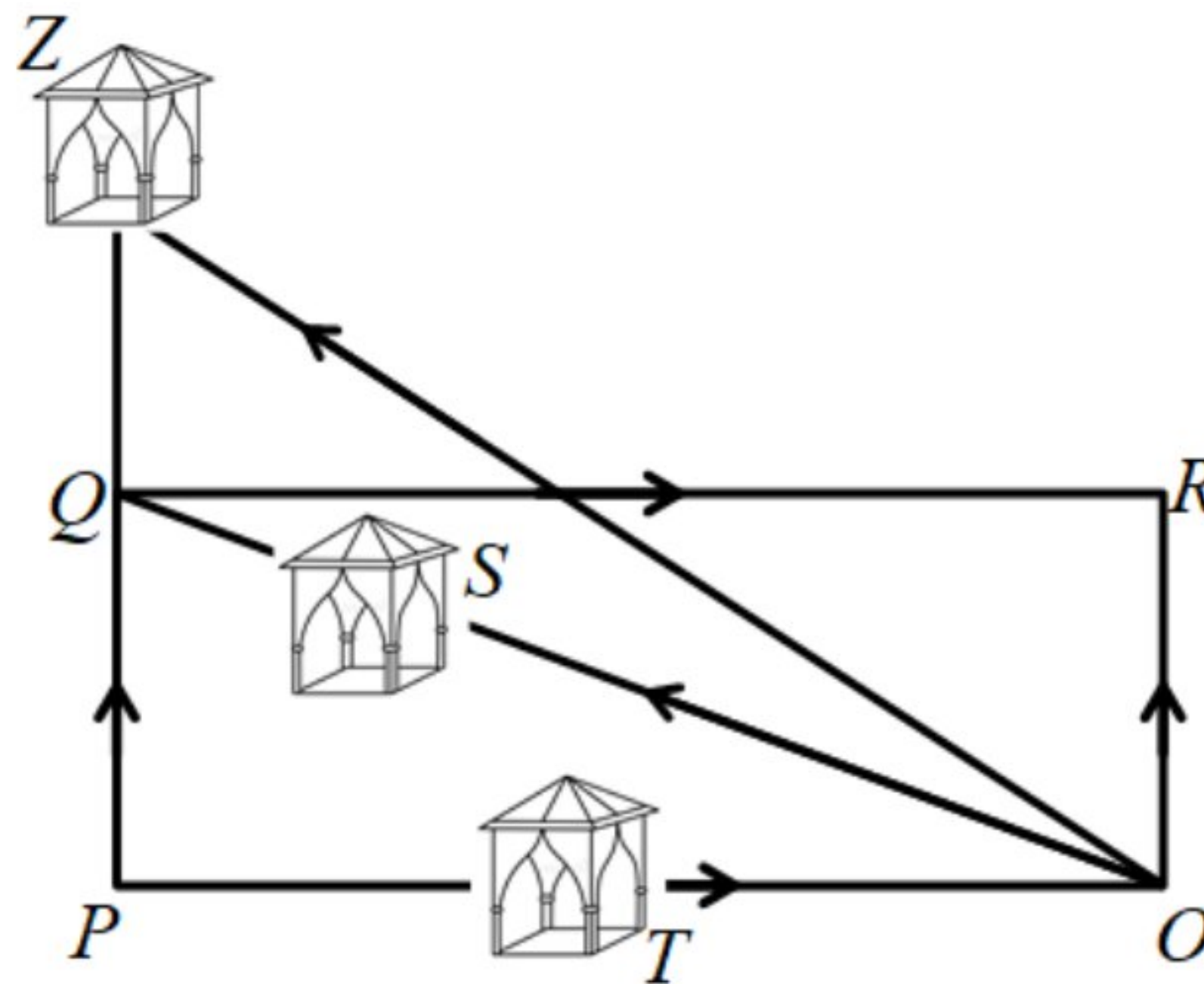
**Ruangan Jawapan Soalan 14 / Answer Space For Question 14**

- 15 Rajah 9 menunjukkan jalan di sebuah bandar yang mengelilingi taman yang berbentuk segi empat tepat  $OPQR$  dan garis lurus yang melalui di tengah taman iaitu  $OQ$ . Gazebo  $S$  terletak di jalan  $OQ$  dan Gazebo  $T$  terletak di jalan  $OP$ . Diberi  $OS = \frac{3}{4}OQ$  dan  $OT : OP = 1 : 2$ . Gazebo  $Z$  pula terletak di jalan  $PQ$  yang dipanjangkan dengan keadaan

$$QZ = \frac{1}{2}PQ. \text{ Jalan } \overline{OP} \text{ diwakili oleh vektor } 4\mathbf{b} \text{ manakala jalan } \overline{OR} \text{ diwakili oleh vektor } 4\mathbf{d}.$$

Diagram 9 shows a street in a city that surrounds a rectangular garden  $OPQR$  and a straight line that passes through the middle of the park is  $OQ$ . Gazebo  $S$  is at  $OQ$  road and Gazebo  $T$  is at  $OP$  road. Given  $OS = \frac{3}{4}OQ$  and

$OT : OP = 1 : 2$ . Gazebo  $Z$  is at  $PQ$  road which is extended with  $QZ = \frac{1}{2}PQ$ .  $\overline{OP}$  road is represented by vector  $4\mathbf{b}$  while  $\overline{OR}$  road is represented by vector  $4\mathbf{d}$ .



Rajah 9 / Diagram 9

- (a) Ungkapkan vektor yang mewakili jalan berikut dalam sebutan  $\mathbf{b}$  dan  $\mathbf{d}$  :
- $\overrightarrow{OQ}$
  - $\overrightarrow{OS}$
  - $\overrightarrow{OZ}$
  - $\overrightarrow{TS}$
- (b) Buktikan bahawa bangunan  $T$ ,  $S$  dan  $Z$  berada dalam satu garis lurus.  
Prove that the Gazebo  $T$ ,  $S$  and  $Z$  reside on the same straight line.

[8 markah]  
[8 marks]

Jawapan / Answer :

**Ruangan Jawapan Soalan 15 / Answer Space For Question 15**

**KEBARANGKALIAN HUJUNG ATAS  $Q(z)$  BAGI TABURAN NORMAL  $N(0, 1)$   
THE UPPER TAIL PROBABILITY  $Q(z)$  FOR THE NORMAL DISTRIBUTION  $N(0, 1)$**

$z$	0	1	2	3	4	5	6	7	8	9	Tolak / Minus								
											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		0.00990	0.00964	0.00939	0.00914			0	1	1	1	1	2	2	2	2
											3	5	8	10	13	15	18	20	23
									0.00889	0.00866	0.00842	2	5	7	9	12	14	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

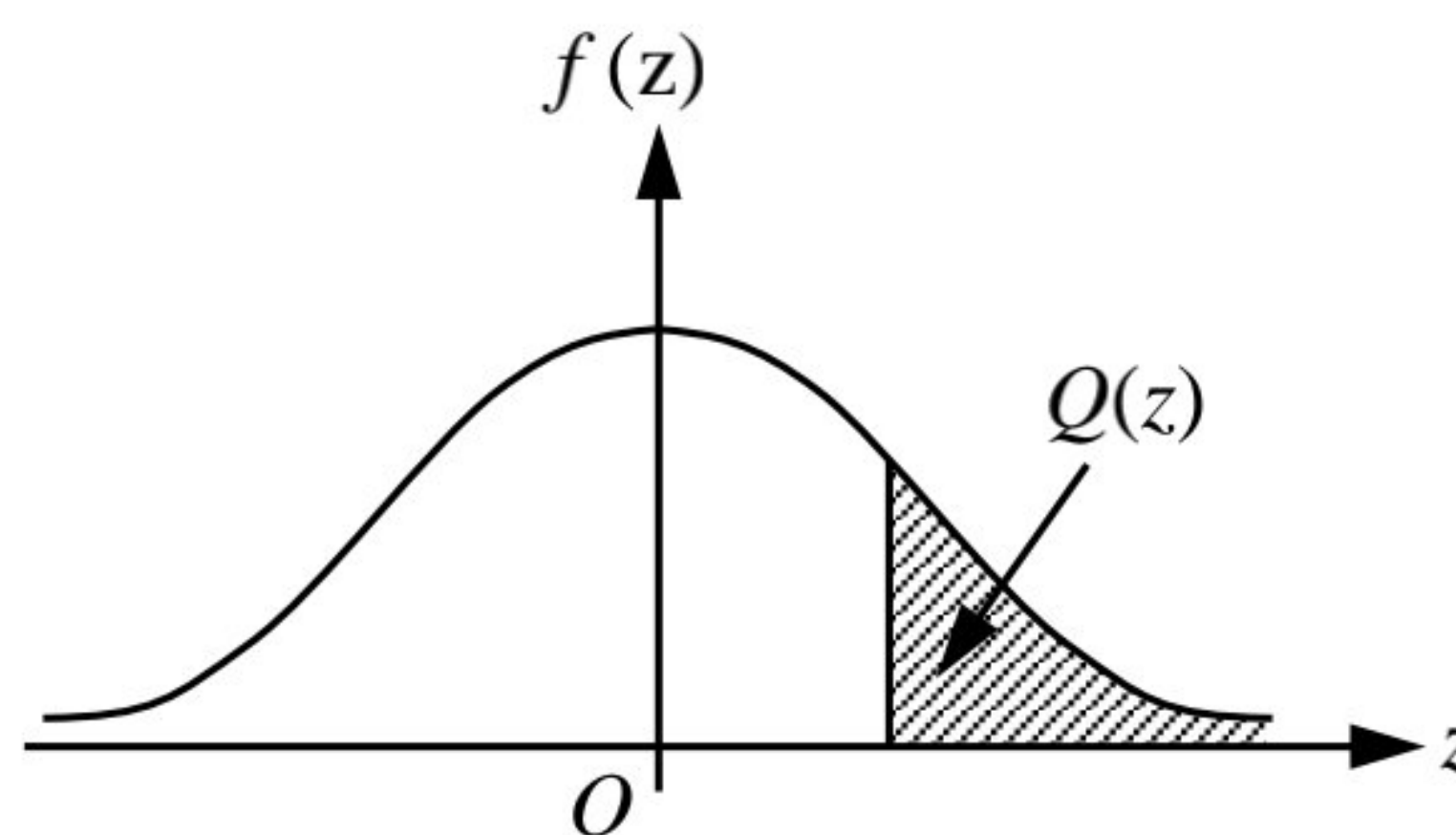
Bagi  $z$  negatif guna hubungan:

For negative  $z$  use relation:

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

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

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



Contoh / Example:

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

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

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

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