

Name :



Form :

PEPERIKSAAN PERCUBAAN SPM TAHUN 2018
JABATAN PENDIDIKAN NEGERI KEDAH
MAJLIS PENGETUA SEKOLAH MALAYSIA (KEDAH)

ADDITIONAL MATHEMATICS (MODULE 1)

Kertas 1

Ogos 2018

2 jam

Dua jam

JANGAN BUKA MODUL INI SEHINGGA DIBERITAHU

1. Tulis nama dan tingkatan anda pada ruangan yang disediakan.
2. Kertas soalan ini adalah dalam dwibahasa.
3. Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.
4. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.
5. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.

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

Modul ini mengandungi 24 halaman bercetak.

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

- 1 The function $f(x) = |2x + q|$ is defined by

Fungsi $f(x) = |2x + q|$ ditakrif sebagai

$$|2x + q| = \begin{cases} 2x + q, & \text{if / jika } f(x) \geq p \\ -(2x + q), & \text{if / jika } f(x) < p \end{cases}$$

where p and q are constants.
dengan keadaan p dan q adalah pemalar.

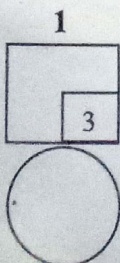
- (a) State the value of p .
Nyatakan nilai bagi p .
- (b) Find the values of q if $f(-2) = 5$.
Cari nilai-nilai q jika $f(-2) = 5$.

[3 marks]
[3 markah]

Answer/Jawapan:

(a)

(b)



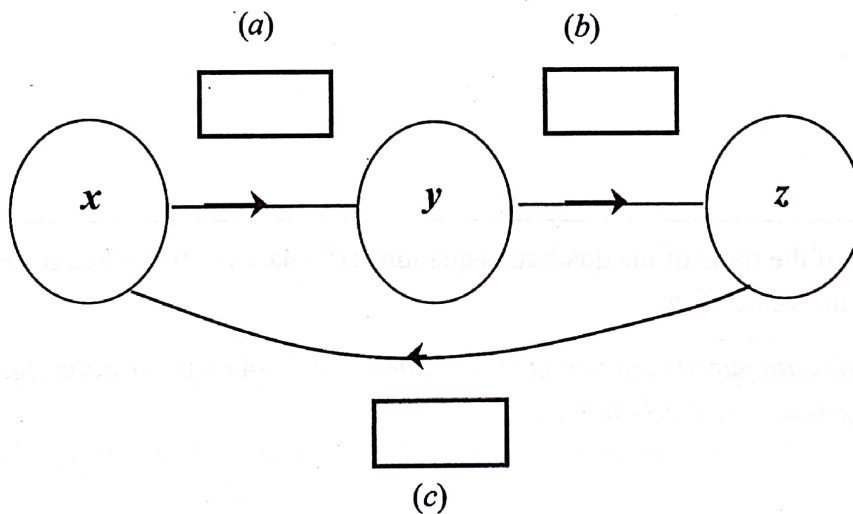
- 2 Based on the statements below, fill in the boxes in the answer space with the correct function.

Berdasarkan pernyataan-pernyataan di bawah, isi petak dalam ruang jawapan dengan fungsi yang betul.

- (a) The function f maps x onto y .
Fungsi f memetakan x kepada y .
- (b) The function g maps y onto z .
Fungsi g memetakan y kepada z .
- (c) The function that maps z onto x .
Fungsi yang memetakan z kepada x .

[2 marks]
[2 markah]

Answer/Jawapan:



- 3 Given $f^{-1}(x) = px + 4$ and $g(x) = 3(x^2 - 4)$. Find

Diberi $f^{-1}(x) = px + 4$ dan $g(x) = 3(x^2 - 4)$. Cari

(a) $f(x)$,

(b) the value of p if $g(x) = \frac{1}{4}f(x^2)$.

nilai p jika $g(x) = \frac{1}{4}f(x^2)$.

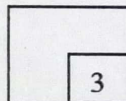
[3 marks]
[3 markah]

Answer/Jawapan:

(a) $f^{-1}(x) = px + 4$

(b)

3



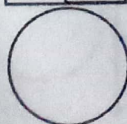
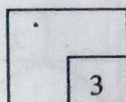
- 4 Given one of the roots of the quadratic equation $2x^2 - 4x + p = 0$ is three times the other root. Find the value of p .

Diberi salah satu punca bagi persamaan kuadratik $2x^2 - 4x + p = 0$ ialah tiga kali ganda punca yang satu lagi. Cari nilai p .

[3 marks]
[3 markah]

Answer/Jawapan:

4



- 5 The quadratic function is defined by $f(x) = x^2 - 6x + k$, where k is a constant.

Fungsi kuadratik ditakrif oleh $f(x) = x^2 - 6x + k$, dengan keadaan k ialah pemalar.

- (a) Express $f(x)$ in the form of $f(x) = (x+r)^2 + s$, where r and s are constant.

Ungkapkan $f(x)$ dalam bentuk $f(x) = (x+r)^2 + s$, dengan keadaan r dan s ialah pemalar.

- (b) Given the minimum value of $f(x)$ is 6, find the value of k .

Diberi nilai minimum bagi $f(x)$ ialah 6, cari nilai k .

[4 marks]

[4 markah]

Answer/Jawapan:

(a)

$$\begin{aligned} f(x) &= (x+r)^2 + s \\ &= x^2 + r^2 + s \end{aligned}$$

(b)

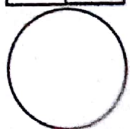
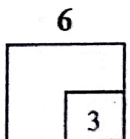
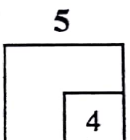
- 6 Given $f(x) = x^2 - x - 12$, find the range of values of x when $f(x) \geq 0$.

Diberi $f(x) = x^2 - x - 12$, cari julat nilai x dengan keadaan $f(x) \geq 0$.

[3 marks]

[3 markah]

Answer/Jawapan:



- 7 Sharifah Jewels wants to buy insurance to cover a diamond they bought in the year 2010 for RM 2000. The value of the diamond increases every year for a period of time, t , in years. The value of the diamond on a certain year can be estimated using $P = P_0(1.05)^t$ where P_0 is the initial value of the diamond.

Sharifah Jewels ingin membeli insurans untuk berlian yang dibeli pada tahun 2010 dengan harga RM 2000. Nilai berlian dijangka meningkat setiap tahun sehingga satu tempoh, t tahun. Nilai berlian pada tahun tertentu dianggarkan sebagai $P = P_0(1.05)^t$ dengan keadaan P_0 ialah nilai asal berlian tersebut.

- (a) Find the value of the diamond, to the nearest RM, in the year 2018.

Cari nilai berlian itu pada tahun 2018 kepada RM terdekat .

- (b) The premium payable is 13% of the value of the diamond for the current year insured. How much is the premium paid by Sharifah Jewels in the year 2018 ?

Premium insuran tahunan yang perlu dibayar ialah 13% daripada nilai berlian pada tahun semasa . Berapakah premium yang akan dibayar oleh Sharifah Jewels pada tahun 2018 ?

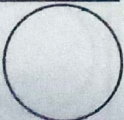
[4 marks]

[4 markah]

Answer/Jawapan:

(a)

(b)



- 8 Given $m = 2^r$ and $n = 2^t$, express $\log_8 \left(\frac{mn^3}{32} \right)$ in terms of r and/or t .

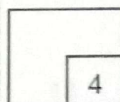
Diberi $m = 2^r$ dan $n = 2^t$, ungkapkan $\log_8 \left(\frac{mn^3}{32} \right)$ sebutan r dan/atau t .

[4 marks]

[4 markah]

Answer/Jawapan:

8



- 9 Given the first term and the common ratio of a geometric progression are 1 and p .

Diberi sebutan pertama dan nisbah sepunya bagi suatu jangjang geometri masing-masing ialah 1 dan p .

- (a) State the range of values of p , so that the sum to infinity for the progression exist.

Nyatakan julat bagi nilai-nilai p supaya hasil tambah hingga ketakterhinggaan jangjang ini wujud.

- (b) If the sum to infinity for the progression is $\frac{5}{4}$, find the value of p .

Jika hasil tambah hingga ketakterhinggaan jangjang ini ialah $\frac{5}{4}$, cari nilai p .

[3 marks]

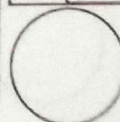
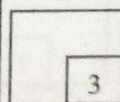
[3 markah]

Answer/Jawapan:

(a)

(b)

9



- 10 Jimmy and Joni take part in a Savings Programme. They planned their daily saving as below:

Jimmy dan Joni menyertai satu Program Menabung. Mereka merancang simpanan wang harian seperti berikut:

Jimmy : RM1, RM2, RM3, ...

Joni : 1 sen, 2 sen, 4 sen, ...

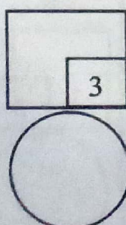
After 15 days, who has a greater total amount of the savings and how much is the difference in total amount ?

Selepas 15 hari, simpanan siapakah mempunyai jumlah wang yang lebih banyak dan berapakah perbezaan jumlah simpanan mereka ?

[3 marks]

[3 markah]

Answer/Jawapan:



- 11 Given $f(x) = \frac{x^3 - 7}{2x + 1}$, find the first derivative of $f(x)$.

Diberi $f(x) = \frac{x^3 - 7}{2x + 1}$, cari terbitan pertama bagi $f(x)$.

[3 marks]

[3 markah]

Answer/Jawapan:

11

3

- 12 A conical container of radius 8 cm and height 16 cm is filled with water. At the same time, water seems to leak away from the vertex of the cone. If the level of the water decreases from 4 cm to 3.9 cm, find the approximate change in volume of the water in the cone?

Sebuah bekas berbentuk kon dengan jejari 8 cm dan ketinggian 16 cm diisi dengan air. Pada masa yang sama air mengalir keluar dari bucu yang bocor. Jika tinggi paras air susut dari 4 cm kepada 3.9 cm, cari perubahan hampir dalam isipadu?

[Given volume of cone / Diberi isipadu kon $V = \frac{1}{3} \pi r^2 h$]

[4 marks]

[4 markah]

Answer/Jawapan:

12

4

- 13 The variable x and y are related by the equation $y = 2x(3x+1)$.

Diagram 13 shows the straight line graph obtained by plotting $\frac{y}{x}$ against x .

Pemboleh ubah x dan y dihubungkan oleh persamaan $y = 2x(3x+1)$.

Rajah 13 menunjukkan graf garis lurus yang diperoleh dengan memplot $\frac{y}{x}$ melawan x .

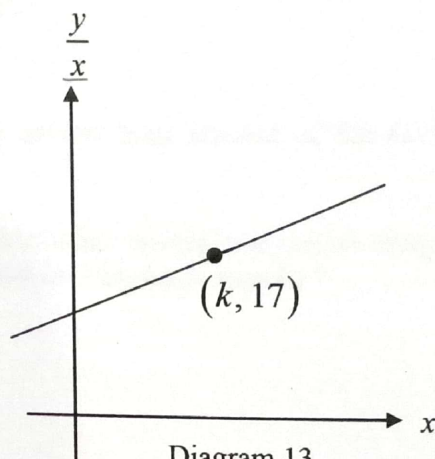


Diagram 13
Rajah 13

- (a) Express the equation $y = 2x(3x+1)$ in its linear form used to obtain the straight line graph shown in Diagram 13.

Ungkapkan persamaan $y = 2x(3x+1)$ dalam bentuk linear yang digunakan untuk memperoleh graf garis lurus seperti ditunjukkan dalam Rajah 13.

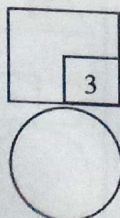
- (b) Find the value of k .

Cari nilai k .

Answer/Jawapan:

[3 marks]
[3 markah]

- (a) $y = 2x(3x+1)$ $\frac{y}{x} = 6x + 2$
 $y = 6x^2 + 2x$
 $\frac{y}{x} = \frac{6x^2}{x} + \frac{2x}{x}$
- (b)



14

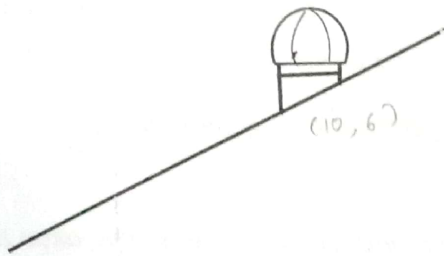


Diagram 14
Rajah 14

Diagram 14 shows the roof of a house installed with an air turbine. The roof has a slope of 15% and the air turbine is installed at point $(10, 6)$. Find the equation of straight line that represents the roof.

Rajah 14 menunjukkan bumbung sebuah rumah yang dipasang turbin udara. Kecuraman bumbung rumah tersebut ialah 15% dan turbin udara dipasang di atas bumbung rumah pada titik $(10, 6)$. Cari persamaan garis lurus bumbung bagi rumah itu.

[3 marks]
[3 markah]

Answer/Jawapan:

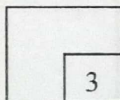
- 15 The probability of Ibrahim goes fishing is 0.6, if he wakes up early in the morning. In any given week, he wakes up late for two days. The probability that he goes fishing by bicycle is $\frac{5}{8}$. Find the probability he did not go fishing on a certain day.

Kebarangkalian Ibrahim pergi memancing ikan adalah 0.6, dia hanya akan pergi memancing jika dia bangun awal pagi, Dalam satu minggu didapati dua hari dia akan bangun lewat. Kebarangkalian dia akan pergi memancing dengan menaiki basikal adalah $\frac{5}{8}$. Cari kebarangkalian dia tidak pergi memancing pada suatu hari tertentu.

[3 marks]
[3 markah]

Answer/Jawapan:

15

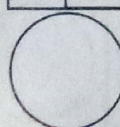
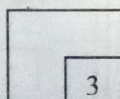


- 16 Solve the equation $2\cot\theta\sin\theta = -1$ for all angles $0 \leq \theta \leq 360^\circ$
Selesaikan persamaan $2\cot\theta\sin\theta = -1$ untuk semua sudut $0 \leq \theta \leq 360^\circ$

[3 marks]
[3 markah]

Answer/Jawapan:

16



17

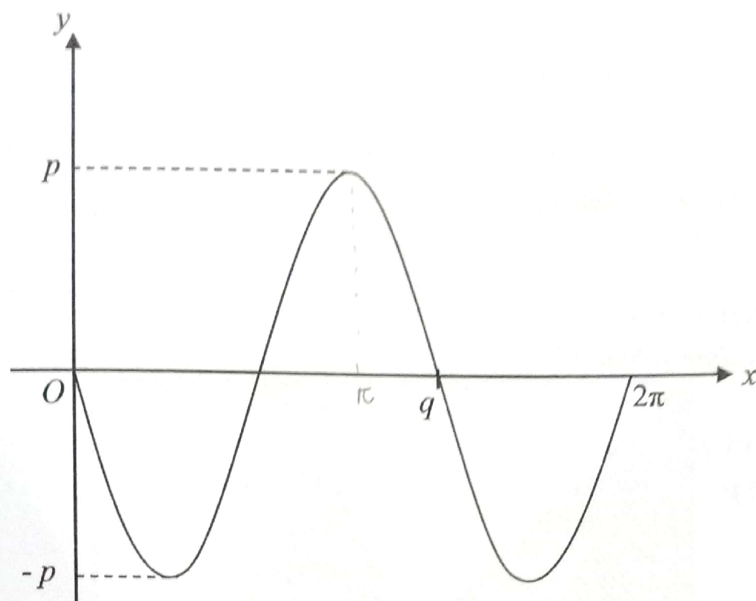


Diagram 17
Rajah 17

Diagram 17 show the graph of trigonometric functions $y = -5 \sin mx$.

State the value of

Rajah 17 menunjukkan graf fungsi trigonometri $y = -5 \sin mx$.

Nyatakan nilai bagi

- (a) p ,
- (b) q ,
- (c) m .

[3 marks]
[3 markah]

Answer/Jawapan:

- (a) 5
- (b) $\frac{2}{3}\pi$
- (c)

- 18 The set of data $2, 2p, 10, p + 10, 18, 3p + 14$ that are arranged in ascending order has mean k . Given that the interquartile range is 12.

*Min bagi set data $2, 2p, 10, p + 10, 18, 3p + 14$ yang disusun secara menaik ialah k .
Diberi julat antara kuartil adalah 12.*

- (a) Express p in terms of k .
Ungkapkan p dalam sebutan k .

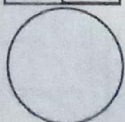
- (b) Find the value of p .
Cari nilai bagi p .

[4 marks]
[4 markah]

Answer/Jawapan:

(a)

(b)



- 19 Diagram 19 shows two equal sectors SRQ and WTV with centres R and T respectively. $RSTU$ is a rectangle. $SW : ST = 1 : 3$. Area of the shaded region is 16.31 cm^2 . Angle of sector SRQ and WTV is 1.047 radians.

Rajah 19 menunjukkan dua sektor yang sama SRQ dan WTV yang masing-masing berpusat di R dan T . $RSTU$ ialah sebuah segiempat tepat. $SW : ST = 1 : 3$. Luas kawasan berlorek ialah 16.31 cm^2 . Sudut sektor SRQ dan WTV ialah 1.047 radians.

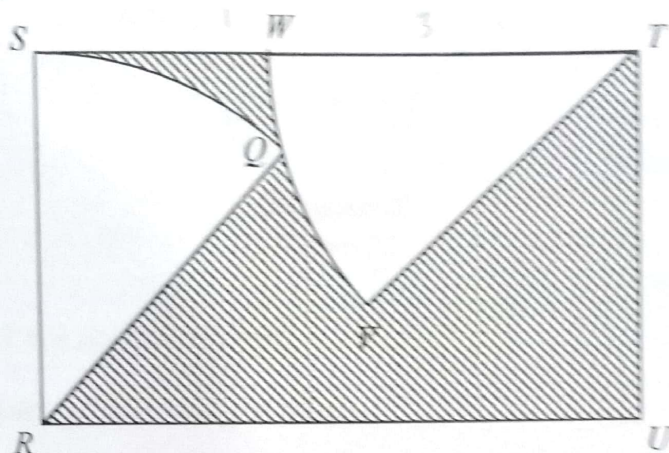


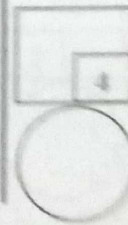
Diagram 19
Rajah 19

Find the radius of the sectors.

Cari jejari sector-sector tersebut.

[4 marks]
[4 markah]

Answer/Jawapan:

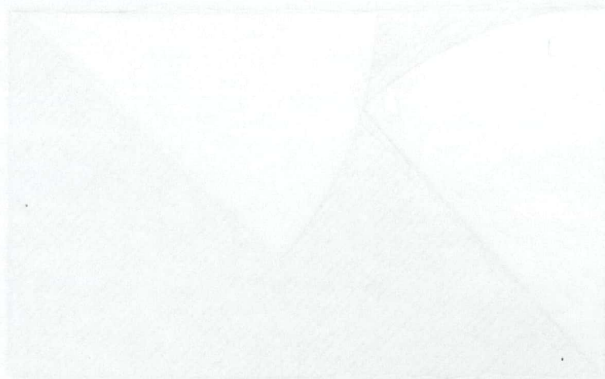


- 20 Given that $6({}^{10}C_r) = {}^{10}P_r$, find the value of r .

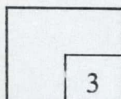
Diberi $6({}^{10}C_r) = {}^{10}P_r$, cari nilai r .

[3 marks]
[3 markah]

Answer/Jawapan:



20



21

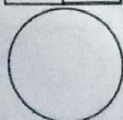
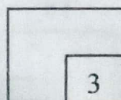
- Given that $\underline{p} = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$, $\underline{q} = \begin{pmatrix} -4 \\ m \end{pmatrix}$, $\underline{r} = \begin{pmatrix} n \\ 4 \end{pmatrix}$. If $\underline{p} + \underline{q} - \underline{r}$ is a unit vector, find the value of m and of n .

Diberi bahawa $\underline{p} = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$, $\underline{q} = \begin{pmatrix} -4 \\ m \end{pmatrix}$, $\underline{r} = \begin{pmatrix} n \\ 4 \end{pmatrix}$. Jika $\underline{p} + \underline{q} - \underline{r}$ ialah vektor unit, cari nilai m dan nilai n .

[3 marks]
[3 markah]

Answer/Jawapan:

21



22

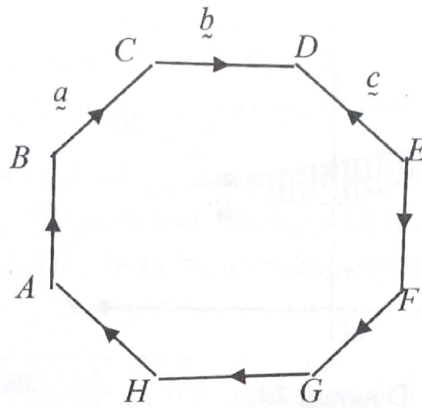
For
examiner's
use only

Diagram 22
Rajah 22

Diagram 22 is a regular octagon.

Rajah 22 ialah sebuah oktagon sekata.

- (a) State the vectors that are equal.
Nyatakan vektor yang sama.

- (b) Express $\overrightarrow{AF}$ in terms of $\underline{a}$, $\underline{b}$ and $\underline{c}$.
Ungkapkan $\overrightarrow{AF}$ dalam sebutan $\underline{a}$, $\underline{b}$ dan $\underline{c}$.

[2 marks]
[2 markah]

Answer/Jawapan:

(a)

(b)

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23

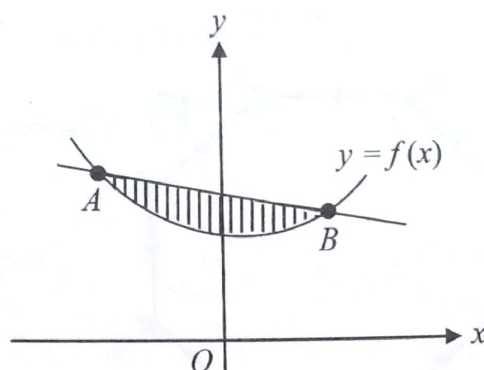


Diagram 23

Rajah 23

Diagram 23 shows part of curve $y = f(x)$ which intersect a straight line at points $A(-2, 8)$ and $B(1, 3)$. Given the area of the shaded region is 7.5 unit^2 , find the value of $\int_{-2}^1 f(x) dx$.

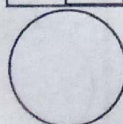
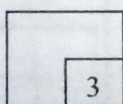
Rajah 23 menunjukkan sebahagian daripada lengkung $y = f(x)$ yang bersilang dengan satu garis lurus pada titik $A(-2, 8)$ dan $B(1, 3)$. Diberi luas kawasan berlorek ialah 7.5 unit^2 , cari nilai bagi $\int_{-2}^1 f(x) dx$.

[3 marks]

[3 markah]

Answer/Jawapan:

23



- 24 An experiment tossing a biased coin for three times was carried out. H denotes the event of obtaining the head and T denotes the event of obtaining the tail. The outcome of the experiment and its probability are shown in Table 24.

Satu ujikaji melambung sekeping duit syiling yang tidak adil sebanyak tiga kali telah dijalankan. H mewakili peristiwa mendapat kepala dan T mewakili peristiwa mendapat ekor. Kesudahan ujikaji serta kebarangkalian berlakunya sesuatu peristiwa ditunjukkan dalam Jadual 24.

Outcome Kesudahan	TTT	TTH	THT	HTT	THH	HTH	HHT	HHH
Probability kebarangkalian	0.216	0.144	0.144	0.144	0.096	0.096	0.096	0.064

Table 24/ Jadual 24

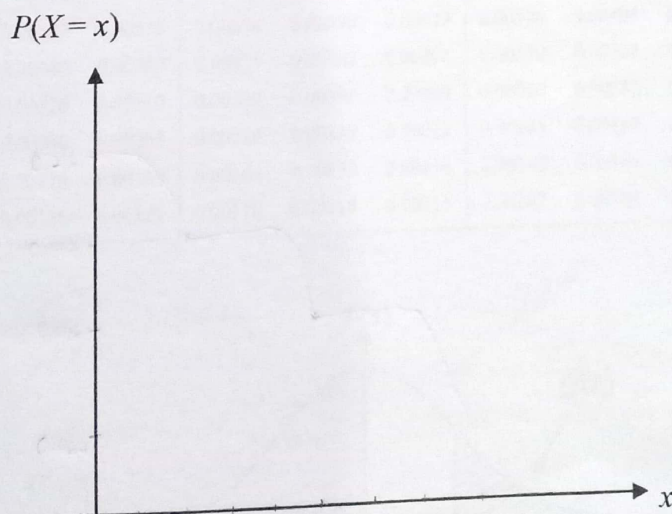
If getting heads is a success event, draw a binomial distribution graph for the above experiment.

Jika mendapat kepala adalah suatu kejayaan, lukiskan graf taburan binomial bagi ujikaji di atas.

[3 marks]

[3 markah]

Answer/Jawapan:



- 25 Diagram 25 (i) shows a normal distribution graph and Diagram 25 (ii) shows a standard normal distribution graph.

Gambarajah 25 (i) menunjukkan graf taburan normal dan graf 25 (ii) adalah graf taburan normal piawai

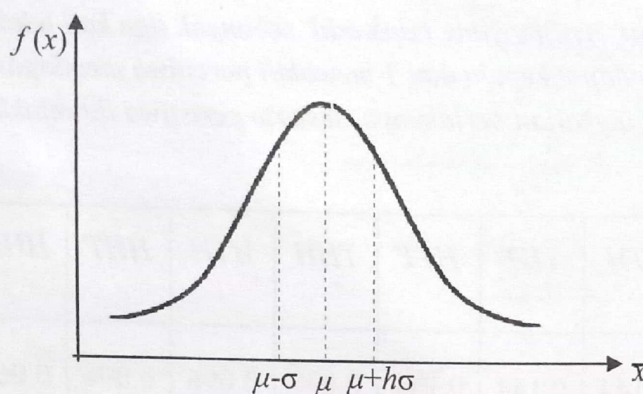


Diagram 25(i)
Rajah 25(i)

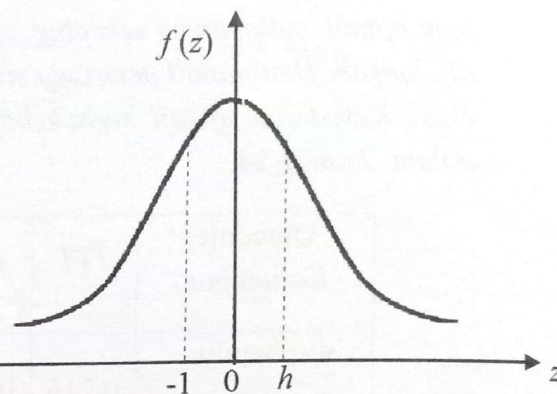


Diagram 25(ii)
Rajah 25(ii)

- (a) State the equation that relates the two graphs.

Nyatakan persamaan yang menghubungkan kedua-dua graf tersebut.

- (b) A normal distribution has a min of 16 and a standard deviation of 5. Find the normal distribution variable, X if given $P(z > h) = 0.3264$.

Suatu taburan normal mempunyai min 16 dan sisihan piawai 5. Cari nilai pemboleh ubah taburan normal, X jika diberi $P(z > h) = 0.3264$.

[4 marks]
[4 markah]

Answer/Jawapan:

(a)

(b)