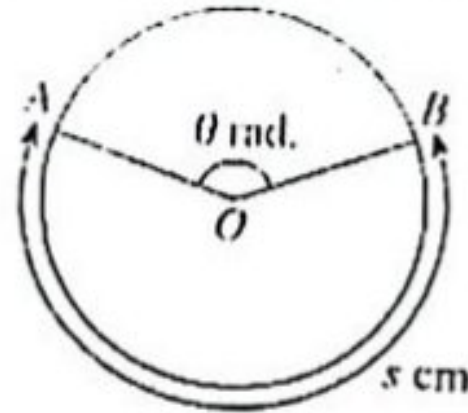


Bahagian A
[64 markah]
Jawab semua soalan

1. Rajah 1 menunjukkan sebuah bulatan berpusat O dan berjejari panjang lengkok major AB . Diberi θ ialah sudut cakah, cari julat nilai s dalam sebutan r dan π .

Diagram 1 shows a circle with centre O and radius of r cm, s is the length of major arc AB . Given θ is an obtuse angle, find the range of values of s in terms of r and π . [2 markah/ marks]



Rajah 1/ Diagram 1

Jawapan/ Answer:

$$\text{When } \theta = \frac{\pi}{2}, s = r(2\pi - \frac{\pi}{2}) \\ = \frac{3\pi}{2}r$$

$$\text{When } \theta = \pi, s = r(2\pi - \pi) \\ = \pi r$$

$$\text{Range} = \pi r < s < \frac{3}{2}\pi r$$

2. Diberi $A(h, k)$ ialah satu titik yang terletak pada graf bagi fungsi $f(x) = 6 - \frac{3}{2}x$.

Given $A(h, k)$ is a point lies on the graph of the function $f(x) = 6 - \frac{3}{2}x$

- (a) Nyatakan koordinat yang sepadan bagi A yang terletak pada graf bagi $f^{-1}(x)$
State the corresponding coordinates of A that lies on the graph of $f^{-1}(x)$.

[1 markah/ mark]

- (b) Diberi bahawa $gf(x) = \frac{4}{x}$, Carikan fungsi $g(x)$

Given that $gf(x) = \frac{4}{x}$, find the function $g(x)$

[3 markah/ marks]

Jawapan/ Answer:

(a) (k, h) .

(b) Let $f^{-1}(x) = y$
 $f(y) = x$.

$$6 - \frac{3}{2}y = x$$

$$\frac{3}{2}y = 6 - x$$

$$y = \frac{2(6-x)}{3}$$

$$= \frac{12-2x}{3}$$

$$\therefore f^{-1}(x) = \frac{12-2x}{3}$$

$$gf(x) = \frac{4}{x}$$

$$g(6 - \frac{3}{2}x) = \frac{4}{x}$$

$$\text{Let } y = 6 - \frac{3}{2}x$$

$$\frac{3}{2}x = 6 - y$$

$$x = \frac{2(6-y)}{3}$$

$$= \frac{12-2y}{3}$$

$$g(y) = \frac{4}{(\frac{12-2y}{3})}$$

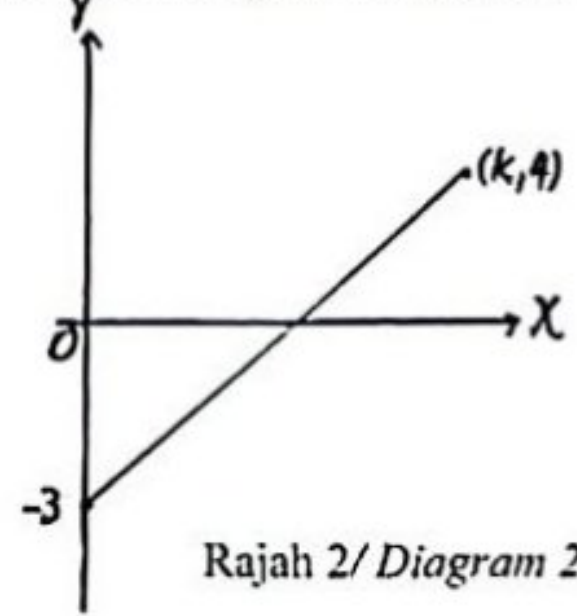
$$= \frac{12}{12-2y}$$

$$= \frac{6}{6-y}$$

$$g(x) = \frac{6}{6-x} \quad \text{X+}$$

Pemboleh ubah x dan y dihubungkan oleh persamaan $y = \frac{px}{x-3p}$, dengan keadaan p ialah pemalar. Rajah 2 menunjukkan satu graf garis lurus yang diperoleh dengan memplot Y melawan X apabila persamaan yang menghubungkan pemboleh ubah x dan y ditukarkan kepada bentuk linear.

The variables x and y are related by the equation $y = \frac{px}{x-3p}$, such that p is a constant. Diagram 2 shows a straight line graph obtained by plotting Y against X when the equation relating the variables x and y is converted to the linear form.



Rajah 2/ Diagram 2

Ungkapkan/ Express

- (a) X dan Y dalam sebutan x dan/atau y . X and Y in terms of x and/or y .
 (b) p dalam sebutan k . p in terms of k .

[2 markah/ marks]

[2 markah/ marks]

Jawapan/ Answer:

$$\begin{aligned} \text{(a)} \quad y &= \frac{px}{x-3p} \\ \frac{1}{y} &= \frac{x-3p}{px} \\ \frac{1}{y} &= \frac{1}{p} - \frac{3}{x} \\ \frac{x}{y} &= \frac{1}{p}x - 3 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad \text{Subs } (k, 4) \text{ into } Y &= \frac{1}{p}X - 3 \\ 4 &= \frac{1}{p}(k) - 3 \\ p &= \frac{k}{7} \end{aligned}$$

Thus, $Y = \frac{x}{y}$ and $X = x$.

4. Diberi fungsi kuadratik $f(x) = 3x^2 + 4x + p$. / Given a quadratic function $f(x) = 3x^2 + 4x + p$.

- (a) Cari julat nilai p dengan keadaan nilai minimum bagi $f(x)$ adalah sentiasa positif.
 Find the range of values of p such that the minimum value of $f(x)$ is always positive
 (b) Jika titik minimum bagi fungsi kuadratik itu ialah (x, y) , ungkapkan p dalam sebutan y .
 If the minimum point of the quadratic function is (x, y) , express p in terms of y .

[2 markah/ marks]

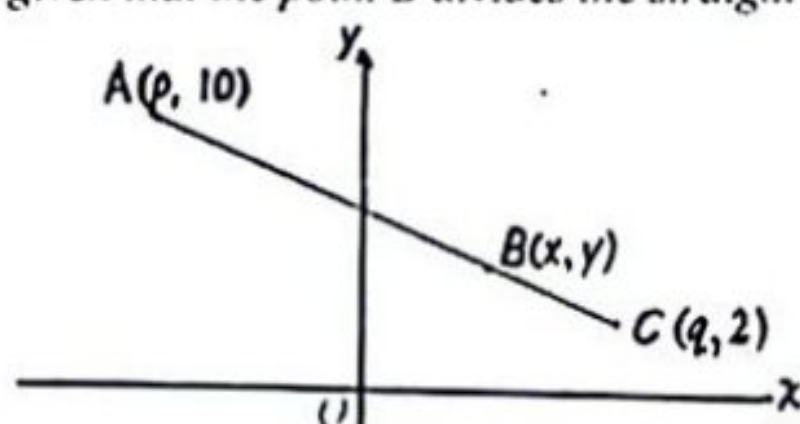
[3 markah/marks]

Jawapan/ Answer:

$$\begin{aligned} \text{(a)} \quad f(x) &= 3x^2 + 4x + p \\ a &= 3, b = 4, c = p \\ b^2 - 4ac &< 0 \\ 4^2 - 4(3)(p) &< 0 \\ 16 - 12p &< 0 \\ -12p &< -16 \\ p &> \frac{4}{3} \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad f(x) &= 3x^2 + 4x + p \\ &= 3 \left[x^2 + \frac{4}{3}x + \frac{p}{3} \right] \\ &= 3 \left[x^2 + \frac{4}{3}x + \left(\frac{2}{3} \right)^2 - \left(\frac{2}{3} \right)^2 + \frac{p}{3} \right] \\ &= 3 \left[\left(x + \frac{2}{3} \right)^2 - \frac{4}{9} + \frac{p}{3} \right] \\ &= 3 \left(x + \frac{2}{3} \right)^2 - \frac{4}{3} + p \\ \therefore y &= -\frac{4}{3} + p \\ p &= y + \frac{4}{3} \end{aligned}$$

5. Rajah 3 menunjukkan satu garis lurus AC . Diberi bahawa titik B membahagikan garis lurus AC dalam nisbah $m:n$.
Diagram 3 shows a straight line AC . It is given that the point B divides the straight line AC in the ratio $m:n$.



Rajah 3/ Diagram 3

- (a) Tunjukkan bahawa $x = \frac{np+mq}{m+n}$. / Show that $x = \frac{np+mq}{m+n}$. [2 markah/ marks]
(b) Diberi bahawa $B = (2, 5)$, ungkapkan p dalam sebutan q . It is given that $B = (2, 5)$, express p in terms of q . [3 markah/ marks]

Jawapan/ Answer:

$$(a) \quad x - p = q - x = m:n$$

$$\frac{x-p}{q-x} = \frac{m}{n}$$

$$n(x-p) = m(q-x)$$

$$nx - np = mq - mx$$

$$nx + mx = mq + np$$

$$x(n+m) = mq + np$$

$$x = \frac{mq + np}{n+m}$$

$$(b). \quad 5 = \frac{n(10) + m(2)}{m+n}$$

$$5(m+n) = 10n + 2m$$

$$5m + 5n = 10n + 2m$$

$$3m = 5n$$

$$\frac{m}{n} = \frac{5}{3}$$

$$\therefore m=5, n=3$$

$$2 = \frac{3p + 5q}{5+3}$$

$$16 = 3p + 5q$$

$$3p = 16 - 5q$$

$$p = \frac{16 - 5q}{3}$$

6. Dalam suatu jangjang geometri, sebutan pertama ialah a dan nisbah sepunya ialah r . Diberi bahawa sebutan pertama melebihi sebutan ketiga sebanyak 25 dan hasil tambah tiga sebutan yang pertama ialah 95.

In a geometric progression, the first term is a and the common ratio is r . It is given that the first term exceeds the third term by 25 and the sum of the first three terms is 95.

- (a) Tunjukkan bahawa $a = \frac{120}{r+2}$. Show that $a = \frac{120}{r+2}$. [3 markah/ marks]

- (b) Hitung hasil tambah hingga ketakterhinggaan jangjang geometri itu jika $r = \frac{2}{3}$.

Calculate the sum to infinity of the geometric progression if $r = \frac{2}{3}$.

[3 markah/ marks]

Jawapan/ Answer:

$$(a) \quad a - ar^2 = 25 \quad \text{--- ①}$$

$$a + ar + ar^2 = 95 \quad \text{--- ②}$$

$$\text{①} + \text{②}: 2a + ar = 120$$

$$a(2+r) = 120$$

$$a = \frac{120}{2+r}$$

$$(b) \quad a = \frac{120}{\frac{2}{3} + 2}$$

$$= 45$$

$$S_{\infty} = \frac{45}{1 - \frac{2}{3}}$$

$$= 135$$

(a) Diberi bahawa $\frac{2(9^y)}{\sqrt{3^x}} - 3^y = 53(3^y)$. Ungkapkan y dalam sebutan x .

Given that $\frac{2(9^y)}{\sqrt{3^x}} - 3^y = 53(3^y)$, express y in terms of x .

[3 markah/ marks]

(b) Selesaikan persamaan $\log_2 x + 3\log_x 16 = 7$.

Solve the equation $\log_2 x + 3\log_x 16 = 7$

[4 markah/ marks]

Jawapan/ Answer:

$$\begin{aligned} (a) \quad \frac{2(9^y)}{\sqrt{3^x}} - 3^y &= 53(3^y) \\ \frac{2(9^y)}{\sqrt{3^x}} &= 54(3^y) \\ \frac{2(3^{2y})}{\sqrt{3^x}} &= 54(3^y) \\ \frac{2 \cdot 3^{2y}}{3^{\frac{x}{2}}} &= 54 \cdot 3^y \\ \frac{2 \cdot 3^{2y}}{3^{\frac{x}{2}}} &= 2 \cdot 3^3 \cdot 3^y \\ \frac{3^{2y}}{3^{\frac{x}{2}}} &= 3^3 \cdot 3^y \\ 3^{2y - \frac{x}{2}} &= 3^{3+y} \\ 2y - \frac{x}{2} &= 3+y \\ y &= \frac{x}{2} + 3 \end{aligned}$$

$$\begin{aligned} (b) \quad \log_2 x + 3\log_x 16 &= 7 \\ \log_2 x + 3\left(\frac{\log_2 16}{\log_2 x}\right) &= 7 \\ \log_2 x + 3\left(\frac{4}{\log_2 x}\right) &= 7 \\ \log_2 x + \frac{12}{\log_2 x} &= 7 \\ \text{Let } y = \log_2 x \\ y + \frac{12}{y} &= 7 \\ y^2 + 12 &= 7y \end{aligned}$$

$$\begin{aligned} y^2 - 7y + 12 &= 0 \\ (y-3)(y-4) &= 0 \\ y=3, \log_2 x &= 3 \\ x &= 8 \end{aligned}$$

$$\begin{aligned} y=4, \log_2 x &= 4 \\ x &= 16 \end{aligned}$$

8. Sebuah bekas terbuka mengandungi 800 cm³ alkohol. Diberi kadar penyejatan alkohol di dalam bekas itu ialah $(6t^2 - 10t + n)$ cm³ per minit, dengan keadaan n ialah pemalar dan t ialah masa, dalam minit, apabila alkohol itu mula menyejat. Diberi isi padu alkohol yang tinggal di dalam bekas itu ialah 724 cm³ selepas 4 minit. Tentukan sama ada semua alkohol di dalam bekas itu menyejat selepas 8 minit. Justifikasikan jawapan anda melalui pengiraan.

An opened container contains 800 cm of alcohol. Given the rate of evaporation of the alcohol in the container is $(6t^2 - 10t + n)$ cm³ per minute, where n is a constant and t is the time, in minutes, when the alcohol begins to evaporate. Given the volume of alcohol left in the container is 724 cm³ after 4 minutes. Determine whether all the alcohol in the container has evaporated after 8 minutes. Justify your answer through calculation.

[5 markah/ marks]

Jawapan/ Answer:

Let V be the volume of alcohol evaporated.

$$\begin{aligned} V &= \int (6t^2 - 10t + n) dt \\ &= 2t^3 - 5t^2 + nt + C \end{aligned}$$

When $t=0$, $V=0$, $C=0$.

$$\therefore V = 2t^3 - 5t^2 + nt$$

$$\text{At } t=4, V_{\text{evaporated}} = 800 - 724 = 76 \text{ cm}^3$$

$$76 = 2(4)^3 - 5(4)^2 + n(4)$$

$$76 = 128 - 80 + 4n$$

$$4n = 28$$

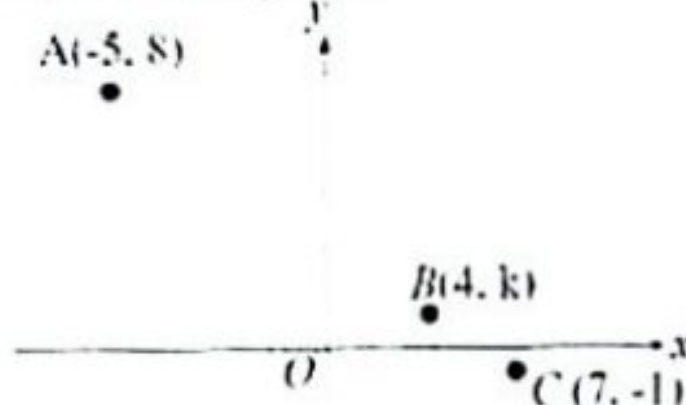
$$n = 7$$

$$\begin{aligned} \text{At } t=8, V_{\text{evaporated}} &= 2(8)^3 - 5(8)^2 + 7(8) \\ &= 760 \end{aligned}$$

The volume of alcohol remaining in the container = $800 - 760$
= 40 cm³.

No, because there is 40 cm³ of alcohol left in the container after 8 minutes

9. Rajah 4 menunjukkan tiga titik A, B dan C pada satu satah cartes.
Diagram 4 shows the three points A, B and C, on a Cartesian plane.



Rajah 4/ Diagram 4

- (a) Diberi $\overrightarrow{BD} = 7i + 2j$ dan $\overrightarrow{OD}$ adalah selari dengan $\overrightarrow{AC}$. Cari nilai k .

Given $\overrightarrow{BD} = 7i + 2j$ and $\overrightarrow{OD}$ is parallel to $\overrightarrow{AC}$. Find the value of k

[5 markah/ marks]

- (b) Cari vektor unit yang selari dengan $\overrightarrow{AC}$. /Find the unit vector that parallel to $\overrightarrow{AC}$.

[2 markah/ marks]

Jawapan/ Answer:

$$\begin{aligned} \text{(a)} \quad \overrightarrow{OD} &= \overrightarrow{OB} + \overrightarrow{BD} \\ -7i + 2j &= -4i - k j + \overrightarrow{OD} \\ \overrightarrow{OD} &= -3i + (k+2)j \end{aligned}$$

$$\begin{aligned} \overrightarrow{AC} &= \overrightarrow{AO} + \overrightarrow{OC} \\ &= 5i - 8j + (7i - j) \\ &= 12i - 9j \end{aligned}$$

$$\overrightarrow{OD} = \lambda \overrightarrow{AC}$$

$$-3i + (k+2)j = \lambda(12i - 9j)$$

Compare both side of the equation

$$-3 = 12\lambda$$

$$\lambda = -\frac{1}{4}$$

$$k+2 = (-\frac{1}{4})(-9)$$

$$k = \frac{1}{4}$$

$$\begin{aligned} \text{(b)} \quad |\overrightarrow{AC}| &= \sqrt{(12)^2 + (-9)^2} \\ &= 15 \text{ units} \end{aligned}$$

$$\begin{aligned} \text{Unit vector} &= \frac{12}{15}i - \frac{9}{15}j \\ &= \frac{4}{5}i - \frac{3}{5}j \end{aligned}$$

10. Cikgu Rahman ingin membentuk satu pasukan yang terdiri daripada 8 orang murid yang dipilih daripada 5 orang murid lelaki dan 7 orang murid perempuan untuk menyertai satu perkhemahan

Teacher Rahman wants to form a team consisting of 8 students selected from 5 boys and 7 girls participate in a camp.

- (a) Jika ketua pasukan itu ialah seorang murid lelaki dan selebih-lebihnya 6 orang murid perempuan dipilih, cari bilangan pasukan yang berlainan yang dapat dibentuk.

If the leader of the team is a boy and at most 6 girls are selected, find the number of different teams that can be formed.

[3 markah/ marks]

- (b) Semua ahli dalam pasukan itu akan disusun dalam dua barisan dengan keadaan bilangan ahli dalam barisan pertama mesti melebihi bilangan ahli dalam barisan kedua. Cari bilangan susunan yang berlainan bagi pasukan itu jika ketua pasukan itu mesti berada di barisan pertama.

All the members in the team will be arranged in two rows such that the number of members in the first row must exceed the number of members in the second row. Find the number of different arrangements of the team if the leader of the team must be in the first row.

[3 markah/ marks]

Jawapan/ Answer:

$$\begin{aligned} \text{(a)} \quad {}^5C_1 \times {}^4C_1 \times {}^7C_6 &+ {}^5C_1 \times {}^1C_2 \times {}^7C_5 + {}^5C_1 \times {}^1C_3 \times {}^7C_4 + {}^5C_1 \times {}^1C_4 \times {}^7C_3 \\ &= (5 \times 4 \times 7) + (5 \times 6 \times 21) + (5 \times 4 \times 35) + (5 \times 1 \times 35) \\ &= 140 + 630 + 700 + 175 \\ &= 1645 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad 5 \times {}^7P_4 \times {}^3P_3 &+ 6 \times {}^7P_5 \times {}^2P_2 + 7 \times {}^8P_6 \times {}^1P_1 \\ &= (5 \times 840 \times 6) + (6 \times 2520 \times 2) + (7 \times 20160 \times 1) \\ &= 25200 + 30240 + 141120 \\ &= 196560 \end{aligned}$$

Persamaan satu lengkung diberi oleh $y = x^3 + \frac{1}{2}kx^2 - 3x$ / The equation of a curve is given by $y = x^3 + \frac{1}{2}kx^2 - 3x$.

- (a) Diberi bahawa satu daripada titik pusingan terletak pada $x = \frac{1}{3}$ / It is given that one of the turning point lies at $x = \frac{1}{3}$
- Cari nilai k . Find the value of k .
 - Seterusnya, cari koordinat bagi satu titik pusingan lagi dan tentukan sama ada ia ialah titik minimum atau titik maksimum. Hence, find the coordinates of another turning point and determine whether it is a minimum point or maximum point.

[6 markah/ marks]

- (b) Persamaan normal kepada lengkung itu pada $A(p, q)$ ialah $y = \frac{x+1}{7}$. Cari nilai-nilai p yang mungkin.

The equation of normal to the curve at $A(p, q)$ is $y = \frac{x+1}{7}$. Find the possible values of p .

[3 markah/ marks]

Jawapan/ Answer:

(a) i. $y = x^3 + \frac{1}{2}kx^2 - 3x$

$\frac{dy}{dx} = 3x^2 + kx - 3$

At $x = \frac{1}{3}$, $\frac{dy}{dx} = 0$.

$3\left(\frac{1}{3}\right)^2 + k\left(\frac{1}{3}\right) - 3 = 0$

$\frac{1}{3} + \frac{1}{3}k - 3 = 0$

$1 + k - 9 = 0$

$k = 8$

ii. $\frac{dy}{dx} = 0$

$3x^2 + 8x - 3 = 0$

$(3x-1)(x+3) = 0$

$x = \frac{1}{3}$ or $x = -3$

When $x = -3$, $y = (-3)^3 + 4(-3) - 3(-3) = 18$

$\frac{d^2y}{dx^2} = 6x + 8$

When $x = -3$, $\frac{d^2y}{dx^2} = 6(-3) + 8 = -10$
 < 0 (max. point).

$\therefore (-3, 18)$ is a maximum point.

(b) $y = \frac{x+1}{7}$

$= \frac{x}{7} + \frac{1}{7}$

gradient of normal $= \frac{1}{7}$

gradient of tangent $= -7$

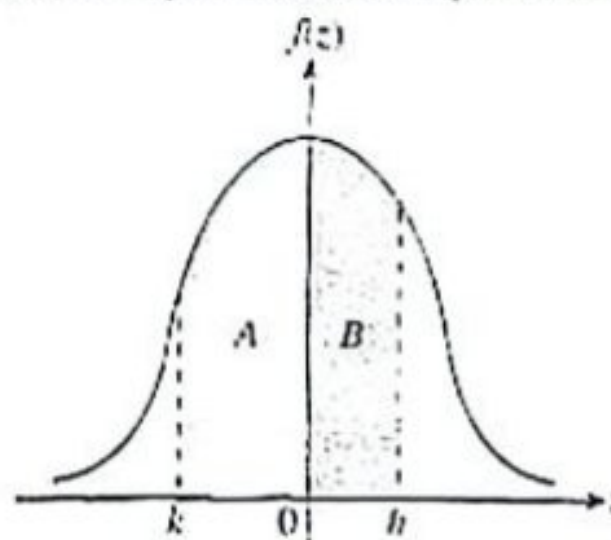
When $x = p$, $3p^2 + 8p - 3 = -7$

$3p^2 + 8p + 4 = 0$

$(3p+2)(p+2) = 0$
 $p = -\frac{2}{3}$ or $p = -2$

12. Rajah 5 menunjukkan graf taburan normal piawai bagi satu pemboleh ubah rawak $X(0, 1)$. Diberi luas kawasan berlorek A adalah dua kali luas kawasan berlorek B dan jumlah luas kawasan berlorek ialah 0.66.

Diagram 5 shows the standard normal distribution graph for a random variable $X(0, 1)$. Given the area of the shaded region A is twice the area of the shaded region B and the total area of the shaded region is 0.66.



Rajah 5/ Diagram 5

Cari nilai/ Find the value of

(a) h

(b) k

[2 markah/ marks]

Jawapan/ Answer:

(a) Area of the shaded region, $A + B = 0.66$

$3[0.5 - P(Z > h)] = 0.66$

$1.5 - 3P(Z > h) = 0.66$

$P(Z > h) = 0.28$

Based on standard normal distribution table,

$P(Z > 0.583) = 0.28$

$h = 0.583$

(b) $P(Z < k) = 1 - 0.66 - 0.28$

$P(Z > -k) = 0.06$

$P(Z > 1.555) = 0.06$

$-k = 1.555$

$k = -1.555$

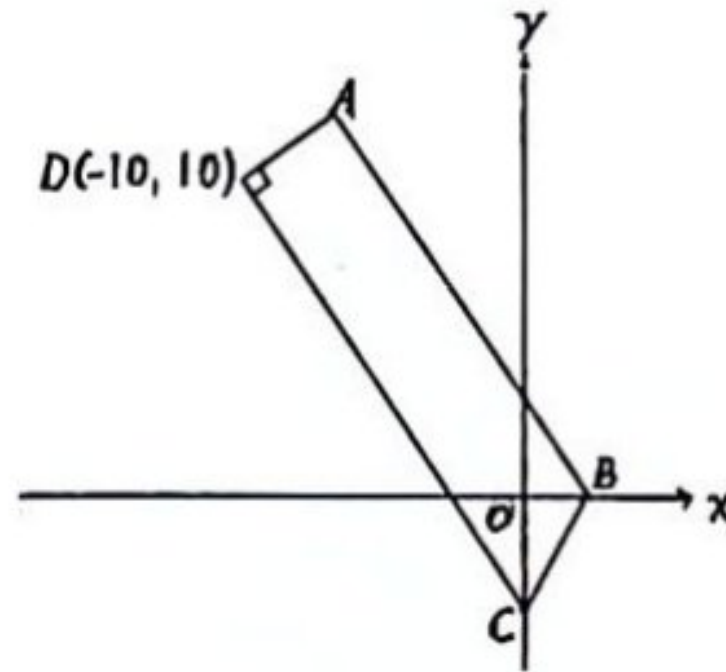
Bahagian B

[16 markah]

Bahagian ini mengandungi tiga soalan. Jawab dua soalan.

13. Rajah 6 menunjukkan trapezium ABCD.

Diagram 6 shows a trapezium ABCD.



Rajah 6/ Diagram 6

Diberi persamaan garis lurus AB ialah $2y + 3x = 6$. / Given the equation of the straight line AB is $2y + 3x = 6$.

Cari/ Find

(a) koordinat titik C

the coordinates of point C.

[2 markah/ marks]

(b) persamaan garis lurus AD.

the equation of the straight line AD.

[3 markah/ marks]

(c) persamaan lokus bagi titik P dengan keadaan segitiga BPD bersudut 90° .the equation of the locus of point P such that the triangle BPD has an angle of 90° at P.

[3 markah/ marks]

Jawapan/ Answer:

(a) $2y + 3x = 6$.

$$y = -\frac{3}{2}x + 3$$

$$\frac{10 - y}{-10 - 0} = -\frac{3}{2}$$

$$y = -5$$

$$\therefore C(0, -5)$$

(b) $m\left(-\frac{3}{2}\right) = -1$

$$m_{AD} = \frac{2}{3}$$

$$y - 10 = \frac{2}{3}[x - (-10)]$$

$$3y - 30 = 2x + 20$$

$$3y = 2x + 50$$

(c) $m_{PD} \cdot m_{PB} = -1$

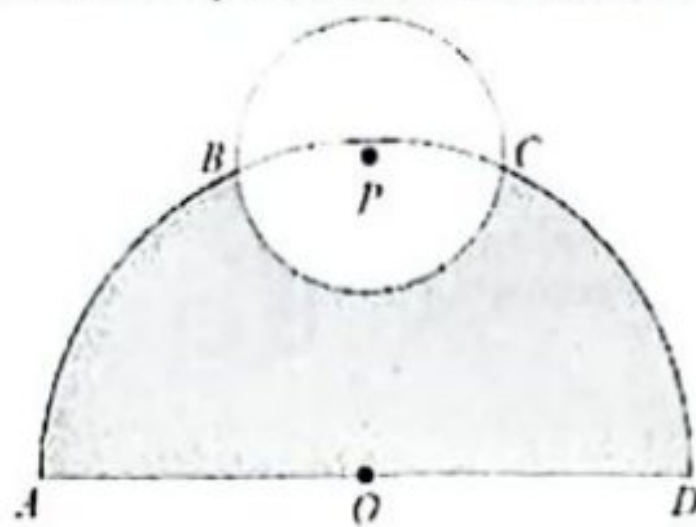
$$\left(\frac{y - 10}{x + 10}\right)\left(\frac{y - 0}{x - 2}\right) = -1$$

$$y^2 - 10y = -1(x + 10)(x - 2)$$

$$y^2 - 10y = -x^2 - 8x + 20$$

$$x^2 + y^2 + 8x - 10y - 20 = 0$$

Rajah 7 menunjukkan sebuah bulatan berpusat P dengan diameter BC , $OABCD$ ialah sebuah semibulatan berpusat O .
 Diagram 7 shows a circle with centre P and a diameter of BC , $OABCD$ is a semicircle with centre O .



Rajah 7/ Diagram 7

[Guna/ Use $\pi = 3.142$]

Diberi bahawa $AD = 2BC = 20$ cm, Cari

Given that $AD = 2BC = 20$ cm, find

- (a) perimeter, dalam cm, kawasan berlorek/ the perimeter, in cm, of the shaded region.
 (b) luas, dalam cm^2 , kawasan berlorek/ the area, cm^2 , of the shaded region.

[4 markah/ marks]

[4 markah/ marks]

Jawapan/ Answer:

$$(a) OB = OA = BC = 10 \text{ cm}, BP = 5 \text{ cm}$$

$$\therefore \angle AOB = \angle BOC = \angle COP = 60^\circ$$

$$= 1.0473 \text{ rad}$$

$$S_{PC} = 5(3.142) = 15.71 \text{ cm}$$

$$S_{AB} = S_{CP} = 10(1.0473) = 10.473 \text{ cm}$$

$$\text{Perimeter} = 15.71 + 2(10.473) + 10 = 56.656 \text{ cm}$$

$$(b) \text{ Area of } \triangle OBC = \frac{1}{2}(10)^2 \sin 60^\circ$$

$$= 43.301 \text{ cm}^2$$

$$\text{Area of semicircle } PBC = \frac{1}{2}(5)^2(3.142)$$

$$= 39.275 \text{ cm}^2$$

$$\text{Area of sector } BOC = \frac{1}{2}(10)^2(1.0473)$$

$$= 52.365 \text{ cm}^2$$

$$\text{Area of semicircle } OABCD = \frac{1}{2}(10)^2(3.142)$$

$$= 157.1 \text{ cm}^2$$

$$\text{Area of the shaded region} = 157.1 - 39.275 - (52.365 - 43.301)$$

$$= 108.761 \text{ cm}^2$$

15. (a) Jadual 1 menunjukkan kebarangkalian bagi taburan binomial $X \sim B(n, p)$.

Table 1 shows the probability the binomial distribution $X \sim B(n, p)$.

X	0	1	2	3	4
$P(X=r)$	$\frac{16}{81}$	$\frac{7}{27}$	k	$\frac{16}{81}$	$\frac{1}{81}$

Jadual 1/Table 1

Cari nilai-nilai bagi k , n dan p . / Find the values of k , n and p .

[4 markah/ marks]

- (b) Diberi X ialah pemboleh ubah rawak selangar di mana $X \sim N(12.45, 9)$. Cari

Given X is the continuous random variable such that $X \sim N(12.45, 9)$. Find

- nilai X apabila skor-z ialah 1.35 / the value of X when the z -score is 1.35
- nilai k apabila $P(|Z| < k) = 0.7881$ / the value of k when $P(|Z| < k) = 0.7881$.

[4 markah/ marks]

Jawapan/ Answer:

$$(a) \quad k = 1 - \left(\frac{16}{81} + \frac{7}{27} + \frac{16}{81} + \frac{1}{81} \right) \\ = \frac{1}{3}.$$

$$k = 4.$$

$$P(X=4) = {}^4C_4 p^4 q^0 = \frac{1}{81} \\ p^4 = \frac{1}{81} \\ p^4 = \left(\frac{1}{3}\right)^4 \\ p = \frac{1}{3}.$$

$$(b) \quad i. \quad z = \frac{X - \mu}{\sigma} \\ 1.35 = \frac{X - 12.45}{3} \\ X = 16.5$$

$$ii. \quad P(|z| < k) = 0.7881 \\ P(z > k) = \frac{1 - 0.7881}{2} \\ = 0.106$$

$$\therefore k = 1.248,$$