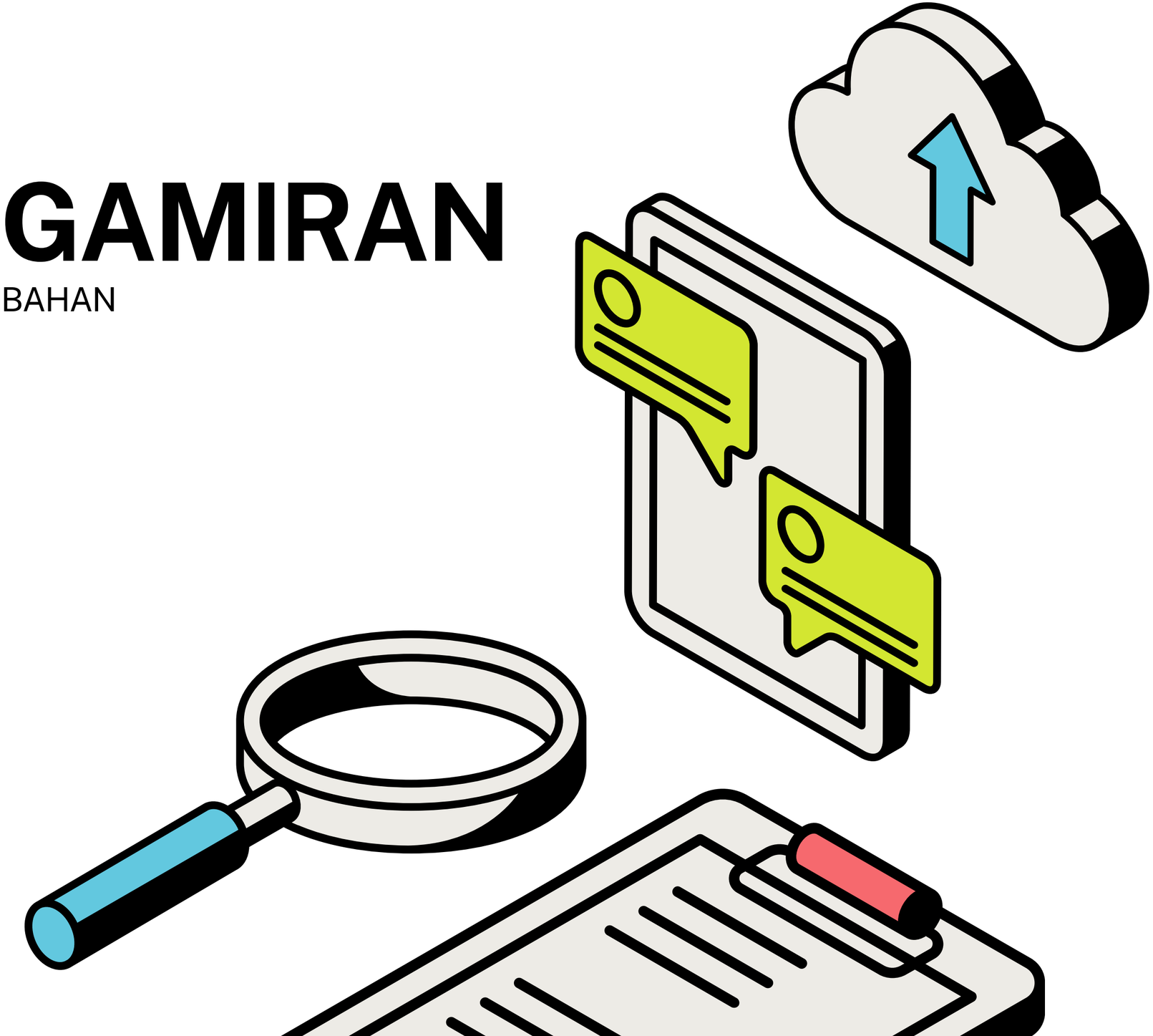
TINGKATAN 5

BAB 3 : PENGAMIRAN

KOMPILASI SOALAN MATEMATIK TAMBAHAN
PERCUBAAN SPM 2023

SKEMA PEMARKAHAN



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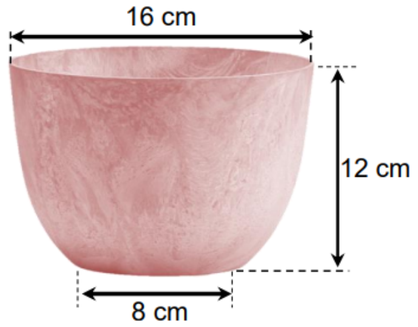
KELANTAN (K1)

PENGAMIRAN

8. Rajah 3 menunjukkan sebuah pasu bunga di mana permukaan sisi dalaman pasu itu boleh diwakili oleh persamaan $y = ax^2$.

Diagram 3 shows a flower vase where the interior side surface of the vase can be represented by an equation $y = ax^2$.



Rajah 3
Diagram 3

Dengan menggunakan ukuran yang diberi, cari isipadu pasu bunga itu dalam cm^3.
Tunjukkan jawapan dalam sebutan π.

[5 *markah*]

Using the measurements given, find the volume, in cm^3 *of the flower vase. Show the answer in term of* π.

[5 *marks*]

8	$16a + 12 = 64a$	K1
	$a = \frac{1}{4}$ *and* $p = 4$ *(Both)*	N1
	$\pi\int_4^{16} 4y\ dy = \pi\left[2y^2\right]_4^{16}$	K1
	$\pi\left[2(16)^2 - 2(4)^2\right]$	K1
	480π	N1

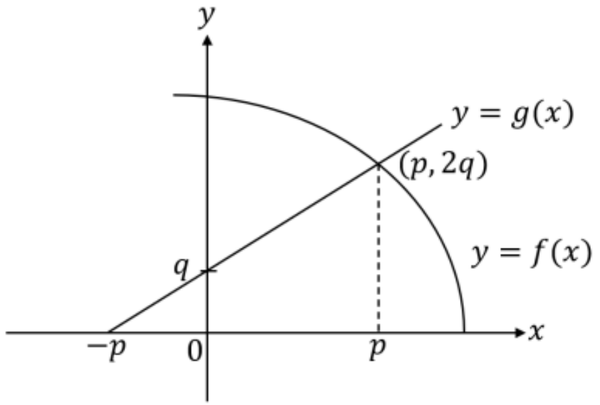
MELAKA (K1)

PENGAMIRAN

7. (a) Diberi $\int_{-3}^{5} f(x)\,dx = 7$, cari $\int_{-3}^{5}[2f(x) - 3x]dx$.
Given that $\int_{-3}^{5} f(x)\,dx = 7$, *find* $\int_{-3}^{5}[2f(x) - 3x]dx$.

[3 *markah*]
[3 *marks*]

(b) Rajah 6 menunjukkan graf bagi suatu lengkung $y = f(x)$ dan garis lurus $y = g(x)$.
Diagram 6 shows a graph for a curve $y = f(x)$ *and a straight line* $y = g(x)$.

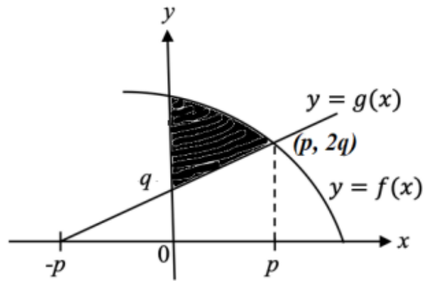


Rajah 6
Diagram 6

Diberi $\int_0^p f(x)\,dx - \int_0^p g(x)\,dx = 10$.
Given that $\int_0^p f(x)\,dx - \int_0^p g(x)\,dx = 10$.

(i) Pada Rajah 6, lorekkan rantau yang diwakili oleh $\int_0^p f(x)\,dx - \int_0^p g(x)\,dx$.
On Diagram 6, shade the region represented by $\int_0^p f(x)\,dx - \int_0^p g(x)\,dx$.

[1 *markah*]
[1 *mark*]

7.	(a)	$2(7)$ atau $3\left[\frac{x^2}{2}\right]_{-3}^{5}$	1
		$2(7) - 3\left[\frac{5^2}{2} - \frac{(-3)^2}{2}\right]$	1
		-10	1
	(b) (i)		1
	(ii)	$10 + \frac{1}{2}p[q + 2q]$	1
		$10 + \frac{3pq}{2}$	1

N9 (K1)

PENGAMIRAN

6 (*a*) Diberi $\int_1^m \frac{g(x)}{2}dx = n$ dan $\int_1^m [g(x)-x]dx = \frac{37}{2}$ dengan keadaan $m > 0$.

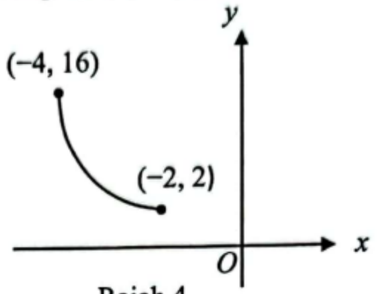
Ungkapkan m dalam sebutan n. [3 *markah*]

Given $\int_1^m \frac{g(x)}{2}dx = n$ *and* $\int_1^m [g(x)-x]dx = \frac{37}{2}$ *such that* $m > 0$.

Express m in terms of n. [3 *marks*]

(*b*) Rajah 4 menunjukkan sebahagian daripada suatu graf lengkung, $y = f(x)$.

Diagram 4 *shows part of a curve graph,* $y = f(x)$.



Rajah 4

Diagram 4

(i) Cari nilai bagi $\int_{-4}^{-2} y\,dx + \left|\int_2^{16} x\,dy\right|$.

Find the value of $\int_{-4}^{-2} y\,dx + \left|\int_2^{16} x\,dy\right|$.

(ii) Diberi fungsi kecerunan bagi lengkung tersebut ialah $4x+5$. Cari $f(x)$.

Given the gradient function of the curve is $4x+5$. *Find* $f(x)$.

[5 *markah*]

[5 *marks*]

6	(a)	$2n$ atau $\left[\frac{x^2}{2}\right]_1^m$	K1
		$2n-\left[\frac{m^2}{2}-\frac{1}{2}\right]=\frac{37}{2}$	K1
		$m=2\sqrt{n-9}$	N1
	(b)(i)	$4(16)$ atau $2(2)$	K1
		$4(16)-2(2)=60$	N1
	(ii)	$\frac{4x^2}{2}+5x+c$	K1
		$2=2(-2)^2+5(-2)+c$ dan selesaikan c	K1
		$f(x)=2x^2+5x+4$	N1

PAHANG (K1)

PENGAMIRAN

5 (a) Jadual 1 menunjukkan pola bagi kamiran tak tentu beberapa fungsi.
Table 1 shows a pattern of indefinite integral of functions.

Fungsi *Function*	Kamiran tak tentu *Indefinite integral*
$y = 4x$	$\int 4x\ dx = \frac{4}{1+1}x^{1+1} + c$
$y = 4x^2$	$\int 4x^2\ dx = \frac{4}{2+1}x^{2+1} + c$
$y = 4x^3$	$\int 4x^3\ dx = \frac{4}{3+1}x^{3+1} + c$
⋮	⋮
$y = 4x^n$	$\int 4x^n dx =$

Jadual 1
Table 1

(i) Buat satu kesimpulan umum secara induktif bagi $\int 4x^n dx$.

Make a general conclusion by induction for $\int 4x^n dx$.

(ii) Tulis satu syarat bagi nilai n dan nyatakan maksud bagi c.
Write one condition for the value of n *and state the meaning of* c.

[3 *markah*]
[3 *marks*]

(b) Seterusnya, cari $\int \frac{(5+x)(5-x)}{x^4} dx$.

Hence, find $\int \frac{(5+x)(5-x)}{x^4} dx$.

[2 *markah*]
[2 *marks*]

5	(*a*)	(i)	$\frac{4}{n+1}x^{n+1} + c$	1
		(ii)	$n \neq -1$	1
			c = pemalar pengamiran	1
	(*b*)		$\frac{25x^{-3}}{-3} - \frac{x^{-1}}{-1}$	1
			$-\frac{25}{3x^3} + \frac{1}{x} + c$	1

PENGAMIRAN

PERLIS (K1)

9 Diberi $\int_3^5 f(x)\,dx = 10$ dan $\int_3^5 3[f(x) - qx]\,dx = 6$, cari

Given that $\int_3^5 f(x)\,dx = 10$ *and* $\int_3^5 3[f(x) - qx]\,dx = 6$, *find*

(a) nilai q,

the value of q,

[3 markah / *marks*]

(b) $\frac{1}{2}\int_5^3 f(x)\,dx + 10$

[2 markah / *marks*]

9			
(a)	$3\int_3^5 f(x)\,dx - 3\int_3^5 qx\,dx = 6$	K1	
	$3\left[10 - \left[\frac{qx^2}{2}\right]_3^5\right] = 6$	K1	
	$q = 1$	N1	**3**
(b)	$\frac{1}{2}(-10) + 10$	K1	
	5	N1	**2**

SABAH (K1)

4. Suatu lengkung mempunyai fungsi kecerunan $4x^3 - px$, dengan keadaan p ialah pemalar. Tangen kepada lengkung pada titik (2, 5) berserenjang dengan garis lurus $x + 8y = 1$. Carikan

A curve has a gradient function of $4x^3 - px$, *where p is a constant. The tangent to the curve at point* (2, 5) *is perpendicular to the line* $x + 8y = 1$. *Find*

a) nilai p, / *the value of p,*

[3 markah/*marks*]

b) persamaan lengkung itu. / *the equation of the curve.*

[3 markah/*marks*]

4	a) $m_1 = -\frac{1}{8}$ atau $m_2 = 8$ atau setara	K1
	Guna $m_1 \times m_2 = -1$ $\left((4(2)^3 - p(2))\left(-\frac{1}{8}\right) = -1\right)$ atau $8 = 4x^3 - px$	K1
	$p = 12$	N1
	b) Kamirkan y terhadap x $y = \frac{4x^4}{4} - \frac{12x^2}{2} + c$	K1
	Ganti (2, 5) ke dalam *kamiran **&** Selesaikan untuk c $5 = (2)^4 - 6(2)^2 + c$	K1
	$c = 13$ $y = x^4 - 6x^2 + 13$	N1

SELANGOR SET 1 (K1)

PENGAMIRAN

9 (*a*) Diberi bahawa $\frac{d}{dx}\left(\frac{3x+2}{4x-1}\right)=\frac{p}{(4x-1)^2}$, cari nilai bagi p.

It is given that $\frac{d}{dx}\left(\frac{3x+2}{4x-1}\right)=\frac{p}{(4x-1)^2}$, *find the value of* p.

[2 markah]
[2 *marks*]

(*b*) Diberi bahawa $\int_1^3 h(x)dx = k$, dengan keadaan k ialah pemalar.

It is given that $\int_1^3 h(x)dx = k$, *such that* k *is a constant.*

Cari
Find

(i) $\int_3^1 \frac{h(x)}{5}\,dx$, dalam sebutan k,

$\int_3^1 \frac{h(x)}{5}\,dx$, *in terms of* k,

(ii) nilai bagi k sekiranya $\int_1^3 [h(x)-kx]\,dx = 3$.

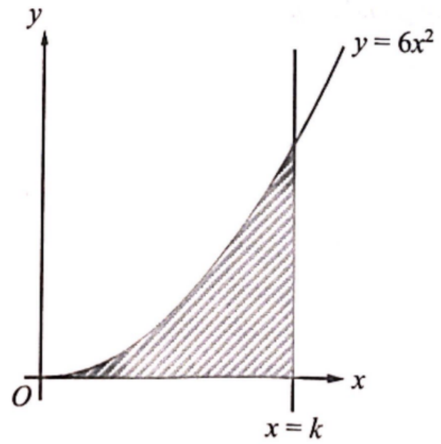
the value of k *if* $\int_1^3 [h(x)-kx]\,dx = 3$.

[3 markah]
[3 *marks*]

9	(*a*)		Bezakan menggunakan petua hasil bahagi $\frac{dy}{dx}=\frac{3(4x-1)-4(3x+2)}{(4x-1)^2}$ atau $p = 3(4x-1)-4(3x+2)$ -11	K1 N1
	(*b*)	(i)	$-\frac{k}{5}$	N1
		(ii)	$k-\left[\frac{kx^2}{2}\right]_1^3 = 3$ -1	K1 N1

(*c*) Rajah 9 menunjukkan lengkung $y = 6x^2$ dan garis lurus $x = k$.

Diagram 9 shows the curve $y = 6x^2$ *and the straight line* $x = k$.



Rajah 9
Diagram 9

Luas kawasan berlorek ialah 54 unit^2. Cari nilai k.

The area of shaded region is 54 unit^2. *Find the value of* k.

[3 markah]

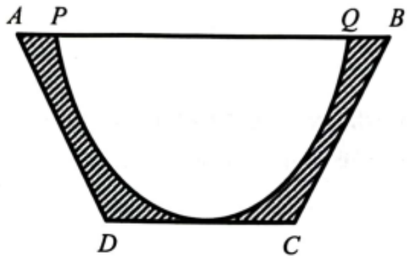
	(*c*)		$\left[\frac{6k^3}{3}\right]_0^3 = 54$	K1
			$\frac{6(k)^3}{3}-0=54$ $k = 3$	K1 N1

SELANGOR SET 2 (K1)

PENGAMIRAN

10 Rajah 10 menunjukkan keratan rentas bagi satu bekas berbentuk trapezium yang mempunyai permukaan dalaman berbentuk parabola dan penutup yang rata. Permukaan dalam bekas itu diwakili oleh fungsi $y = ax^2$. Diberi bahawa panjang AB dan CD masing-masing ialah 12 cm dan 8 cm, $AP = QB = 1$ cm dan tinggi bekas itu ialah 8 cm.

Diagram 10 *shows a cross-sectional of a trapezium shaped container which has a parabolic inner surface and a flat cover. The inner surface of the container represented by the function* $y = ax^2$. *It is given that the length of AB and CD are* 12 cm *and* 8 cm *respectively,* $AP = QB = 1$ cm *and the height of the container is* 8 cm.



Rajah 10
Diagram 10

Cari
Find

(*a*) nilai *a*,
the value of a,

[2 markah]
[2 *marks*]

(*b*) luas, dalam cm^2, bagi rantau berlorek,
the area, in cm^2, *of the shaded region*,

[4 markah]
[4 *marks*]

(*c*) isi padu maksimum beras itu, dalam sebutan π, yang boleh disimpan dalam bekas tersebut jika penutup bekas itu ditutup rapat.
the maximum volume of the rice, in term of π, *that can be stored in the container if the cover of the container is tightly closed.*

[2 markah]

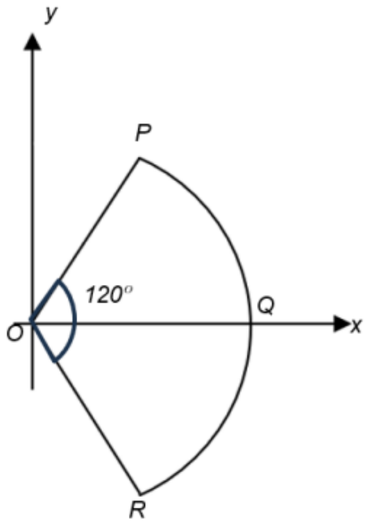
10	(*a*)		$8 = a(5^2)$ $a = \frac{8}{25}$	K1 N1
	(*b*)		Alternatif A $\int_0^8 \frac{5\sqrt{y}}{\sqrt{8}} dy = \left[\frac{5y^{\frac{3}{2}}}{\sqrt{8}\left(\frac{3}{2}\right)}\right]_0^8$ $\frac{1}{2}(12+8)(8) - 2\times\int_0^8 \frac{5\sqrt{y}}{\sqrt{8}} dy$ $= 80 - 2\times\left[\frac{5(8)^{\frac{3}{2}}}{\sqrt{8}\left(\frac{3}{2}\right)} - \frac{5(0)^{\frac{3}{2}}}{\sqrt{8}\left(\frac{3}{2}\right)}\right]$ $= 26\frac{2}{3}$ Alternatif B $\int_0^5 \frac{8x^2}{25} dx = \left[\frac{8x^3}{25(3)}\right]_0^5$ $2\times\left[\int_0^5 \frac{8x^2}{25} dx - \frac{1}{2}(1)(4) + \frac{1}{2}(1)(4)\right]$ $= 2\times\left[\frac{8(5)^3}{25(3)} - \frac{8(0)^3}{25(3)}\right]$ $= 26\frac{2}{3}$	K1 K1 K1 N1 K1 K1 K1 N1
	(*c*)		$V = \pi\int_0^8 \frac{25y}{8} dy$ $= \pi\left[\frac{25}{8}\left(\frac{y^2}{2}\right)\right]_0^8$ $= \pi\left[\frac{25}{8}\left(\frac{8^2}{2}\right) - \frac{25}{8}\left(\frac{0^2}{2}\right)\right]$ $= 100\pi$	K1 N1

KELANTAN (K2)

PENGAMIRAN

11 (a) Rajah 7 menunjukkan bahawa lengkok OPQR ialah sebahagian daripada graf $x^2 + y^2 = 16$ yang simetri pada paksi-x. Diberi bahawa OPQR ialah sektor bulatan berpusat di O dan $\angle POR = 120^0$.

Diagram 7 shows that OPQR *arc is a part of a graph* $x^2 + y^2 = 16$ *which is symmetrical at the x-axis. It is given that* OPQR *is a sector of a circle with centre* O *and* $\angle POR = 120^0$.



Rajah 7
Diagram 7

Cari isipadu janaan, dalam sebutan π apabila sektor OPQR diputarkan melalui 180° pada paksi-x. [6 *markah*]

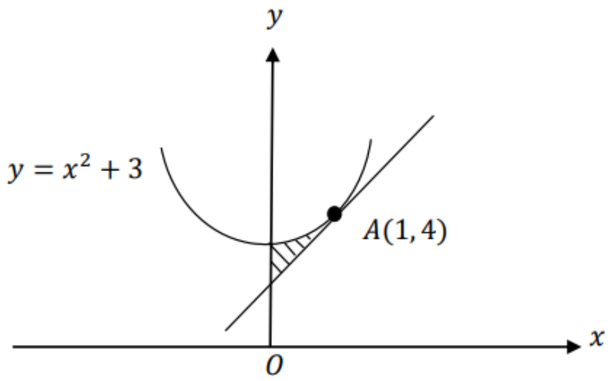
Find the volume generated, in terms of π *when the sector* OPQR *is rotated through* 180° *on the x-axis.* [6 *marks*]

11(a)	$Q(4,0)$	P1
	$\sin 60^0 = \frac{h}{4}$ atau $kos 60^0 = \frac{b}{4}$ atau $h = 2\sqrt{3}$ atau $b = 2$	K1
	$V_1(kon) = \frac{1}{3}\pi\left(2\sqrt{3}\right)^2(2)$ atau $V_2 = \pi\left[16x - \frac{x^3}{3}\right]_2^4$	K1
	$\pi\left[\left(16(4) - \frac{4^3}{3}\right) - \left(16(2) - \frac{2^3}{3}\right)\right]$	K1
	$V_1 + V_2 = \frac{1}{3}\pi\left(2\sqrt{3}\right)^2(2) + \pi\left[\left(16(4) - \frac{4^3}{3}\right) - \left(16(2) - \frac{2^3}{3}\right)\right]$	K1
	$\frac{64\pi}{3}$	N1

MELAKA (K2)

PENGAMIRAN

10 Rajah 5 menunjukkan lengkung $y = x^2 + 3$ dan tangen pada lengkung pada titik $A(1,4)$.
Diagram 5 shows the curve $y = x^2 + 3$ *and the tangent to the curve at the point* $A(1,4)$.



Rajah 5 / *Diagram 5*

Cari
Find

(a) persamaan tangen pada titik A,
the equation of the tangent at point A,

[3 markah/*marks*]

(b) luas kawasan rantau yang berlorek,
the area of the shaded region,

[4 markah/*marks*]

(c) isi padu janaan, dalam sebutan π, apabila rantau yang dibatasi oleh lengkung, paksi-y dan garis lurus $y = 5$ dikisarkan melalui 180^0 pada paksi-y.
the volume of generated, in terms of π *, when the region bounded by the curve, the y - axis and the straight line* $y = 5$ *is rotated through* 180^0 *about the y-axis.*

[3 markah/*marks*]

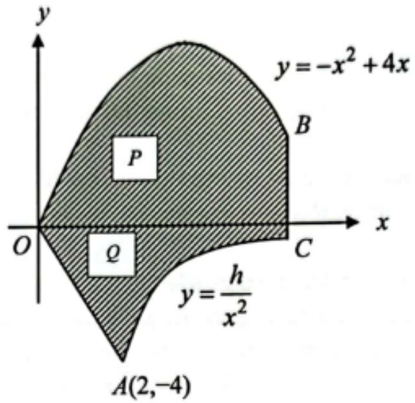
10 (a)	$m = \frac{dy}{dx} = 2x$ $m = 2(1) = 2$	1
	$y - 4 = 2(x - 1)$	1
	$y = 2x + 2$	1
(b)	Luas lengkung, $A_1 = \int_0^1 (x^2 + 3)\, dx = \left[\frac{x^3}{3} + 3x\right]_0^1$	1
	Luas trapezium, $A_2 = \frac{1}{2}(2 + 4)(1)$	1
	Luas = $A_1 - A_1$ atau setara	1
	$= \left[\frac{x^3}{3} + 3x\right]_0^1 - 3$	
	$= \frac{1}{3}$	1
(c)	$= \frac{1}{2}\pi \left[\frac{y^2}{2} - 3y\right]_3^5$	1
	$= \frac{1}{2}\pi \left[\frac{5^2}{2} - 3(5)\right] - \frac{1}{2}\pi \left[\frac{3^2}{2} - 3(3)\right]$	1
	$= \pi$	1

N9 (K2)

PENGAMIRAN

10 Rajah 5 menunjukkan sebahagian daripada lengkung $y = \frac{h}{x^2}$ dan $y = -x^2 + 4x$. Diberi OA dan BC adalah garis lurus di mana BC selari dengan paksi-y.

Diagram 5 shows a part of the curve $y = \frac{h}{x^2}$ *and* $y = -x^2 + 4x$. *Given OA and BC are straight lines where BC is parallel to the y-axis.*



Rajah 5
Diagram 5

Cari
Find

(*a*) nilai h, [1 *markah*]
the value of h, [1 *mark*]

(*b*) persamaan garis lurus BC jika luas rantau Q ialah $\frac{20}{3}$ unit^2. Seterusnya, cari luas rantau berlorek bagi keseluruhan rajah. [6 *markah*]
the equation of the straight line BC if the area of the region Q is $\frac{20}{3}$ unit^2. *Hence, find the area of the shaded region for the whole diagram.* [6 *marks*]

(*c*) isi padu janaan, dalam sebutan π, apabila rantau kawasan P dikisarkan melalui 360° pada paksi-x. [3 *marks*]
the volume generated, in terms of π, when the region P is revolved through 360° about the x-axis. [3 *marks*]

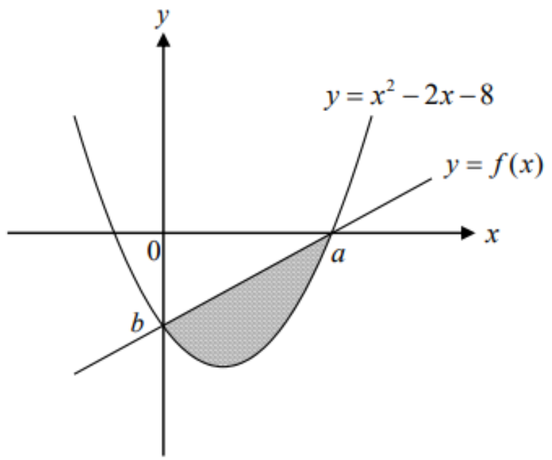
10(a)	$h = -16$	N1
10(b)	$\left[-\frac{16x^{-1}}{-1}\right]$ atau $\left[-\frac{x^3}{3} + \frac{4x^2}{2}\right]$ (untuk bahagian seterusnya)	K1
	$\left(\frac{16}{m}\right) - \left(\frac{16}{2}\right) = -\frac{8}{3}$ atau $\frac{1}{2}(2)(4)$ (m atau sebarang huruf mewakili pemalar)	K1
	$m = 3$	N1
	$\left(-\frac{(*3)^3}{3} + \frac{4(*3)^2}{2}\right) - \left(-\frac{(0)^3}{3} + \frac{4(0)^2}{2}\right)$	K1
	$9 + \frac{20}{3}$	K1
	$\frac{47}{3}$ // 15.67	N1
10(c)	$\pi\left[\frac{x^5}{5} - \frac{8x^4}{4} + \frac{16x^3}{3}\right]_0^{*3}$	K1
	$\pi\left[\left(\frac{(*3)^5}{5} - \frac{8(*3)^4}{4} + \frac{16(*3)^3}{3}\right) - \left(\frac{(0)^5}{5} - \frac{8(0)^4}{4} + \frac{16(0)^3}{3}\right)\right]$	K1
	$\frac{153}{5}\pi$ // 30.6π	N1

PAHANG (K2)

PENGAMIRAN

10 (*a*) Dalam Rajah 4, garis lurus $y = f(x)$ menyilang lengkung $y = x^2 - 2x - 8$ pada paksi-x dan paksi-y masing-masing di a dan b.

Diagram 4 shows a straight line $y = f(x)$ which intersects the curve $y = x^2 - 2x - 8$ on the x and y-axes at a and b respectively.



Rajah 4

Diagram 4

(i) Adakah anda bersetuju dengan pernyataan $\int_0^a f(x)dx = \int_b^0 f^{-1}(y)dy$?

Berikan justifikasi anda.

Are you agree with the statement $\int_0^a f(x)dx = \int_b^0 f^{-1}(y)dy$?

Give your justification.

(ii) Cari luas rantau berlorek.

Find the area of the shaded region.

[6 *markah*]

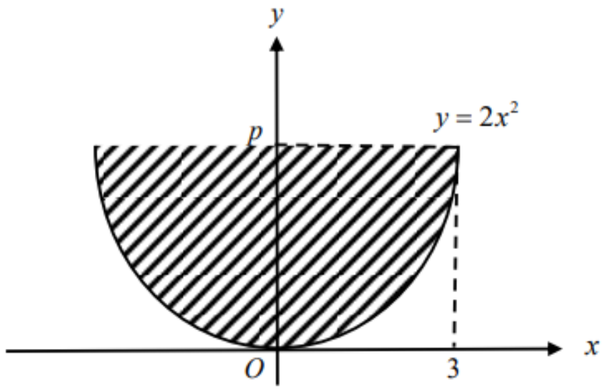
[6 *marks*]

10	(*a*)	(i)	Tidak setuju kerana nilai tidak sama luas @ nilai tidak sama besar	1
		(ii)	$a = 4$ **dan** $b = -8$	1
			$\int \frac{x^3}{3} - x^2 - 8\ dx$	
			$= \frac{x^3}{3} - x^2 - 8x$	1
			Guna $\int_0^4 \frac{x^3}{3} - x^2 - 8\ dx$ atau $\frac{1}{2} \times 4 \times 8$	1
			$A_1 - A_2$ **atau** $A_1 - A_3$	1
			$\frac{32}{3}$	1

PAHANG (K2)

PENGAMIRAN

(*b*)



Rajah 5
Diagram 5

Dalam Rajah 5, hitungkan isipadu yang dijanakan, dalam sebutan π, apabila rantau yang dibatasi oleh lengkung $y = 2x^2$, $y = 0$ dan $y = p$ dikisarkan 180° pada paksi-*y*.

On Diagram 5, *calculate the volume generated, in terms of* π, *when the region bounded by the curve* $y = 2x^2$, $y = 0$ *and* $y = p$ *is revolved through* 180° *about the y-axis.*

[4 *markah*]
[4 *marks*]

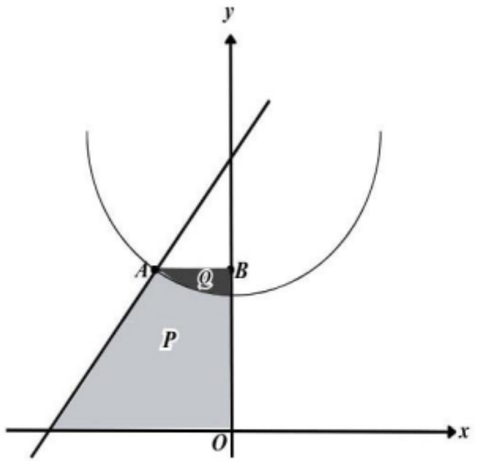
(*b*)		$p = 18$	1
		$\pi\left[\frac{y^2}{4}\right]$	1
		$\pi\left[\frac{18^2}{4} - \frac{0^2}{4}\right]$	1
		81π	1

PERLIS (K2)

PENGAMIRAN

9 Rajah 9 menunjukkan garis lurus $\frac{y}{6}-\frac{x}{6}=1$ menyilang lengkung $4y=x^2+12$ pada titik A.

Diagram 9 shows the straight line $\frac{y}{6}-\frac{x}{6}=1$ *intersects the curve* $4y=x^2+12$ *at point A.*



Rajah 9 / *Diagram 9*

(a) Cari koordinat A.
Find the coordinates of A.

[2 markah / *marks*]

(b) Hitung / *Calculate*

(i) luas rantau berlorek P.
the area of shaded region P.

(ii) isi padu kisaran, dalam sebutan π, apabila rantau berlorek Q diputarkan melalui 360° pada paksi-y.
the volume of revolution, in term of π, when the shaded region Q is rotated through 360° about the y-axis.

[8 markah / *marks*]

9

(a) Selesaikan persamaan serentak — K1

$(x-6)(x+2)=0$

$A=(-2,4)$ — N1

2

(b)

(i) Cari luas segitiga atau gantikan had $\int_{-2}^{0}\frac{x^2}{4}+3dx$ — K1

$A_1=\frac{1}{2}(4)(^*4)$ $\quad A_2=[\frac{(-2)^3}{12}+3(-2)]$

Kamirkan $\int\frac{x^2}{4}+3dx$ — K1

$[\frac{x^3}{4(3)}+3x]$

$*A_1+*A_2$ — K1

$\frac{44}{3}$ — N1

4

(ii) $x^2=4y-12$ — P1

Kamirkan $\int\pi x^2\,dy$ — K1

$\pi[\frac{4y^2}{2}-12y]$

Guna had $\int_3^4 kedalam\ [\frac{4y^2}{2}-12y]$ — K1

$\pi[(\frac{4(4)^2}{2}-12(4))-(\frac{4(3)^2}{2}-12(3))]$

N1 $\quad 2\pi\ unit^2$

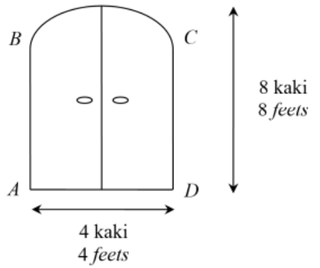
4

SABAH (K2)

PENGAMIRAN

10. a) Walter ingin membuat pintu dengan bahagian atasnya berbentuk parabola seperti yang ditunjukkan dalam rajah.

Walter wanted to make a door with a parabolic top as shown in the diagram.



Diberi bahawa fungsi kecerunan lengkung BC ialah $px + 2$, dengan keadaan p ialah pemalar. (Anggapkan titik A sebagai asalan)

Given that the gradient function of the curve BC is $px + 2$, *where* p *is a constant.*

(Assume point A as origin)

(i) Cari persamaan lengkung BC dalam bentuk $y = ax^2 + bx + c$, dengan keadaan a, b dan c ialah pemalar.

Find the equation of the curve BC in the form $y = ax^2 + bx + c$, *where a, b and c are constants.*

[3 markah/*marks*]

(ii) Hitung kos untuk membuat pintu itu jika harganya RM30 setiap kaki persegi.

Calculate the cost to make the door if the price is RM30 *per square feet.*

[3 markah/*marks*]

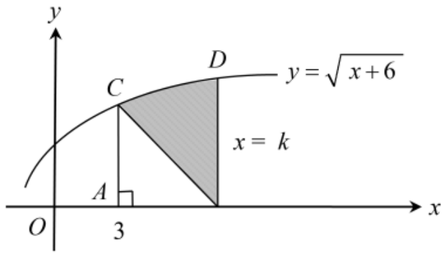
10	a) i) Gantikan $x = 2$ ke dalam $\frac{dy}{dx}$ **&** Samakan $\frac{dy}{dx}$ dengan 0	K1
	$p = -1$	
	Kamirkan $\int(-x + 2)\,dx$ **&** Gantikan $x = 2$ dan $y = 8$ ke dalam kamiran	K1
	$8 = -\frac{(2)^2}{2} + 2(2) + c$	
	$c = 6$	
	$y = -\frac{x^2}{2} + 2x + 6$	N1
	ii) Kamirkan $\int\left(-\frac{x^2}{2} + 2x + 6\right)dx$	K1
	$2\int_0^2\left(-\frac{x^2}{2} + 2x + 6\right)dx$	
	$2\left[\left(-\frac{(2)^3}{6} + (2)^2 + 6(2)\right) - \left(-\frac{(0)^3}{6} + (0)^2 + 6(0)\right)\right]$	K1
	$\frac{88}{3} \times 30$	
	880	N1
	Atau Kamirkan $\int\left(-\frac{x^2}{2} + 2x + 6\right)dx$	K1
	$\int_0^4\left(-\frac{x^2}{2} + 2x + 6\right)dx$	
	$\left(-\frac{(4)^3}{6} + (4)^2 + 6(4)\right) - \left(-\frac{(0)^3}{6} + (0)^2 + 6(0)\right)$	K1
	$\frac{88}{3} \times 30$	
	880	N1

SABAH (K2)

PENGAMIRAN

b) Rajah menunjukkan sebahagian daripada lengkung $y = \sqrt{x+6}$, garis lurus $x = k$ dan garis lurus AC.

The diagram shows part of a curve $y = \sqrt{x+6}$, the straight line $x = k$, and the straight line AC.



Apabila kawasan berlorek dikisarkan 360° pada paksi-x, isi padu yang dijanakan ialah $42\frac{1}{2}\pi$ unit^3. Cari nilai k.

When the shaded region is revolved 360° about the x-axis, the volume generated is $42\frac{1}{2}\pi$ unit^3. Find the value of k.

[4 markah/*marks*]

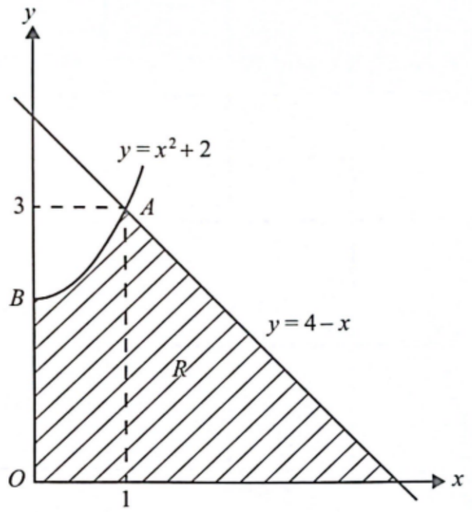
b) Kamirkan $\pi\int\left(\sqrt{x+6}\right)^2 dx$ @ cari isipadu kon $\left(V_1 = \pi\left[\frac{x^2}{2}+6x\right] \ @ \ V_2 = \frac{1}{3}\pi(3)^2(k-3)\right)$	K1
Guna had $\int_3^k$ ke dalam V_1 $\left(V_1 = \pi\left[\left(\frac{(k)^2}{2}+6(k)\right)-\left(\frac{(3)^2}{2}+6(3)\right)\right]\right)$	K1
Samakan $*V_1 - *V_2$ $(V_1 > V_2)$ dengan $42\frac{1}{2}\pi$ $\pi\left[\left(\frac{(k)^2}{2}+6(k)\right)-\left(\frac{(3)^2}{2}+6(3)\right)\right]-\frac{1}{3}\pi(3)^2(k-3) = 42\frac{1}{2}\pi$	K1
$k = 8$	N1

SABAH (K2)

PENGAMIRAN

11 Rajah 11 menunjukkan lengkung $y = x^2 + 2$ bersilang dengan garis lurus $y = 4 - x$ pada titik $A(1, 3)$ dan paksi–y pada titik B.

Diagram 11 shows the curve $y = x^2 + 2$ intersects the straight line $y = 4 - x$ at point $A(1, 3)$ and the y–axis at point B.



Rajah 11
Diagram 11

Cari
Find

(*a*) luas rantau berlorek R,
the area of the shaded region R,

[6 markah]
[6 *marks*]

(*b*) isi padu yang dijanakan, dalam sebutan π, apabila rantau yang dibatasi oleh lengkung $y = x^2 + 2$, garis lurus $y = 3$ dan paksi–y dikisarkan melalui 360° pada paksi–y.
the volume generated, in terms of π, when the region bounded by the curve $y = x^2 + 2$, the straight line $y = 3$ and the y–axis is revolved through 360° about the y–axis.

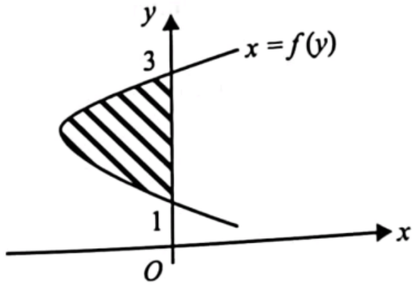
[4 markah]
[4 *marks*]

11	(*a*)		(4,0) Kamirkan $\int x^2 + 2 \; @ \int 4 - x$ $A_1 = \frac{x^3}{3} + 2x \qquad A_2 = 4x - \frac{x^2}{2}$ Guna had $\int_0^{*1}$ ke ${}^*A_1$ $A_2 = \frac{1}{2}(3)(3) \; @ \int_1^4 4x - \frac{x^2}{2}$ ${}^*A_1 + {}^*A_2$ $\frac{41}{6}$	P1 K1 K1 K1 K1 N1
	(*b*)		$B(0,2)$ Kamirkan x^2 terhadap y	P1 K1
			Guna had $\int_{*2}^3$ ke dalam hasil kamiran $\pi * \left[\frac{y^2}{2} - 2y\right]$ $\frac{1}{2}\pi$	K1 N1

SELANGOR SET 2 (K2)

PENGAMIRAN

2 (*a*) Rajah 2 menunjukkan sebahagian daripada lengkung $x = f(y)$.
Diagram 2 shows part of the curve $x = f(y)$.



Rajah 2
Diagram 2

Diberi bahawa luas rantau berlorek adalah 5 unit². Cari nilai bagi $\int_3^1 2f(y)\,dy$.
Given that the area of the shaded region is 5 unit². *Find the value of* $\int_3^1 2f(y)\,dy$.
[2 markah]
[2 *marks*]

(*b*) Fungsi kecerunan suatu lengkung ialah $px^2 - 2x$ dengan keadaan p ialah pemalar. Diberi bahawa lengkung itu melalui titik $S(1, 6)$ dan $T(-2, -15)$. Cari persamaan lengkung itu.
The gradient function of a curve is $px^2 - 2x$, *where p is a constant. Given that the curve passes through points* $S(1, 6)$ *and* $T(-2, -15)$. *Find the equation of the curve.*
[5 markah]

2	(a)	$\int_3^1 2f(y)\ dy = (-2) \times (-5)$	P1
		10	N1
	(b)	Kamirkan $\int px^2 - 2x\ dx$	K1
		$y = \frac{px^3}{3} - x^2 + c$	K1
		Ganti $(1,6)$ @ $(-2,-15)$ dalam $*y = \frac{px^3}{3} - x^2 + c$	K1
		$6 = \frac{p(1)^3}{3} - (1)^2 + c$ @ $-15 = \frac{p(-2)^3}{3} - (-2)^2 + c$	
		Selesaikan untuk p @ c $p = 6$ @ $c = 5$	K1
		$y = 2x^3 - x^2 + 5$	N1