KEMENTERIAN PENDIDIKAN
JABATAN PENDIDIKAN NEGERI PERAK

MODUL BLUE DIAMOND

Matematik Tambahan

TINGKATAN 5

Bab 3

PENGAMIRAN
(*Integration*)

JABATAN PENDIDIKAN NEGERI PERAK
We Deliver

NAMA :_____

KELAS :_____

KERTAS 1

1 a Bezakan $\frac{2x}{3x^2+4}$ terhadap x

Differentiate $\frac{2x}{3x^2+4}$ with respect to x

[2 markah]

[2 *marks*]

b Seterusnya, tentukan $\int \frac{4-3x^2}{(3x^2+4)^2}\,dx$

Hence, determine $\int \frac{4-3x^2}{(3x^2+4)^2}\,dx$

[2 markah]

[2 *marks*]

Jawapan / *Answer* :

Sumber : Ticket To Victory 1 | Kertas 1 | Set 1 | Soalan 2

2 (*a*) Lengkapkan jadual dan terbitkan rumus kamiran tak tentu secara induktif.
Complete the table and derive the formula for indefinite integral by induction.

Fungsi / Function	$f'(x)$	$\int f'(x)dx$	Pola
$f(x) = 2x + c$	2	2x +c	$\frac{2(1)x^{0+1}}{0+1} + c$
$f(x) = 2x^2 + c$	$4x$	$2x^2 + c = \frac{4x^2}{2} + c$	$\frac{4x^{1+1}}{1+1} + c$
$f(x) = 2x^3 + c$			
$f(x) = 2x^4 + c$			

[4 markah]
[4 *marks*]

(*b*) Kamirkan $\frac{3}{(5x-3)^6}$ terhadap x
Intergrate $\frac{3}{(5x-3)^6}$ *respect to x*

[3 markah]
[3 *marks*]

Jawapan/ *Answer:*

Sumber : Ticket To Victory 1 | Kertas 1 | Set 2 | Soalan 12

3 (*a*) Diberi $\int (1+2x)^4\,dx = k(1+2x)^n + c$, cari nilai k dan nilai n.

Given that $\int (1+2x)^4\,dx = k(1+2x)^n + c$, *find the value of k and of n.*

[4 markah]
[4 *marks*]

(*b*) Cari persamaan lengkung yang mempunyai fungsi kecerunan $x^2(x+3)$ dan melalui titik (2,14)

Find the equation of the curve which has the gradient function $x^2(x+3)$ *and passes through the point* (2, 14).

[4 markah]
[4 *marks*]

Jawapan / *Answer* :

Sumber : Ticket To Victory 1 | Kertas 1 | Set 3 | Soalan 14

4 (a) Diberi bahawa $f'(x) = 2x^2 - x - 1$.
Given that $f'(x) = 2x^2 - x - 1$.

(i) Cari koordinat-koordinat titik pegun.

(ii) *Find the coordinates of the stationary point.*
Seterusnya, tentukan sifat bagi titik pegun tersebut.
Hence, determine the nature of stationary point.

[4 markah]
[4 *marks*]

(b) Diberi bahawa $\int_1^2 8f(x)dx = 11$, cari
Given that $\int_1^2 8f(x)dx = 11$ *, find*

(i) $\int_1^2 4f(x)dx,$

(ii) nilai k jika $\int_1^2 [10f(x) - kx]dx = 10.$
the value of k if $\int_1^2 [10f(x) - kx]dx = 10.$

[4 markah]
[4 *marks*]

Jawapan/ *answer* :

Sumber : Ticket To Victory 2 | Kertas 1 | Set 1 | Soalan 14

5 (*a*) Selesaikan setiap yang berikut.
Solve each of the following.

Diberi $\frac{d}{dx}(4x-3)^6 = 24(4x-3)^5$, cari $\int 3(4x-3)^5 dx$.

Given that $\frac{d}{dx}(4x-3)^6 = 24(4x-3)^5$, *find* $\int 3(4x-3)^5 dx$.

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

(*b*) Diberi $\frac{d}{dx}\left(\frac{x^2}{x+3}\right) = \frac{x(x+6)}{(x+3)^2}$. Cari nilai $\int_1^2 \frac{x(x+6)}{2(x+3)^2} dx$.

Given $\frac{d}{dx}\left(\frac{x^2}{x+3}\right) = \frac{x(x+6)}{(x+3)^2}$. *Find the value* $\int_1^2 \frac{x(x+6)}{2(x+3)^2} dx$.

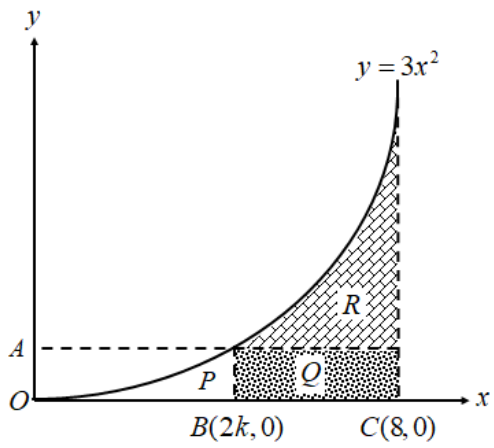
[4 *markah*]
[4 *marks*]

Jawapan / A*nswer* :

Sumber : Modul Gempur | Kertas 1 | Set 1 | Soalan 5

5 Rajah 1 menunjukkan sebahagian daripada lengkung $y = 3x^2$.

Diagram 1 shows part of the curve $y = 3x^2$.



Rajah 1

Diagram 1

P, *Q* dan *R* menunjukkan luas kawasan di bawah graf dan $OA:OB = 5:2$.

P, Q and R shows the area under the graph and $OA:OB = 5:2$.

(*a*) Buktikan luas kawasan *Q* ialah $-10k^2 + 40k$ dan cari nilai *k* sekiranya luas kawasan *Q* ialah 40 $unit^2$.

Show that the area of Q is $-10k^2 + 40k$ *and find the value of k if the area of Q is* 40 $unit^2$.

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

(*b*) Seterusnya, cari luas kawasan *R*.

Hence, find the area of R.

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

Jawapan/ A*nswer* :

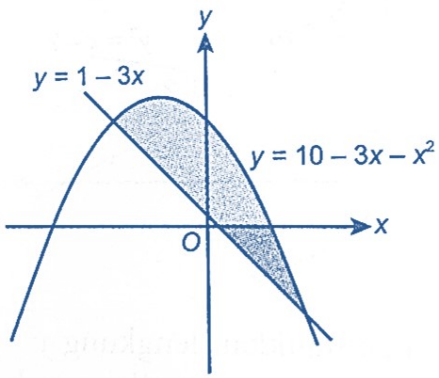
Sumber : Modul Gempur | Kertas 1 | Set 2 | Soalan 5

1 (*a*) Isi padu air, V cm^3, di dalam sebuah bekas diberi oleh $V = 5h + \frac{1}{3}h^3$, dengan h ialah aras air, dalam cm, di dalam bekas itu. Diketahui bekas itu diisi dengan air pada kadar 3 $cm^3\ s^{-1}$. Cari kadar perubahan aras air di dalam bekas situ pada ketika aras air ialah 4 cm.
The volume of water in a container, V cm^3, in a container is given by $V = 5h + \frac{1}{3}h^3$, *where h cm is the water level in the container. The container is being filled with water at a rate of 3 $cm^3\ s^{-1}$. Find the rate of change of the water level in the container at the instant when the water level is* 4 *cm.*

[3 markah]

[3 *marks*]

(*b*)



Rajah 2 / *Figure 2*

Rajah 2 menunjukkan lengkung $y = 10 - 3x - x^2$ dan garis lurus $y = 1 - 3x$. Cari luas rantau berlorek.
Diagram 2 shows a curve $y = 10 - 3x - x^2$ *and straight line* $y = 1 - 3x$. *Find the area of the shaded region.*

[7 markah]

[7 *marks*]

(i) fungsi *f* dalam sebutan *m*,
function f in term of m,

[2 markah]

[2 *marks*]

(ii) nilai *m* jika $f^{-1}f(m^2 + 7) = g[(2 + m)^2]$.
the value of m if $f^{-1}f(m^2 + 7) = g[(2 + m)^2]$.

[2 markah]

[2 *marks*]

Jawapan / *Answer* :

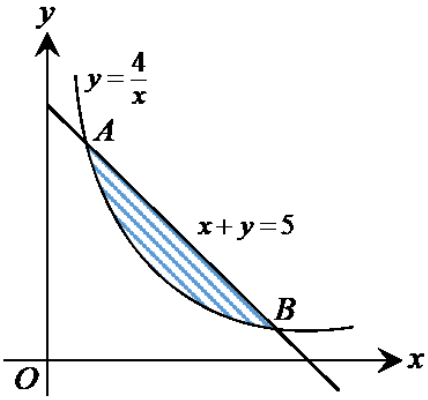
Sumber : Ticket To Victory 1 | Kertas 2 | Set 1 | Soalan 9

2 (*a*) Cari persamaan normal bagi lengkung $y = 2x^2 - 4x - 3$ pada titik $(2, -3)$.
Find the equation of the normal to the curve $y = 2x^2 - 4x - 3$ *at point* $(2, -3)$.

[4 markah]

[4 *marks*]

(*b*)



Rantau yang dibatasi oleh lengkung $y = \frac{4}{x}$ dan garis lurus *AB* dikisarkan 360º dengan selengkapnya pada paksi-*x*. Hitung isipadu, dalam sebutan π, bagi pepejal kisaran yang terhasil.
The region bounded by the curve $y = \frac{4}{x}$ *and the straight line AB is revolved through* 360º *about the x-axis. Calculate the volume, in terms of* π, *of the solid of revolution.*

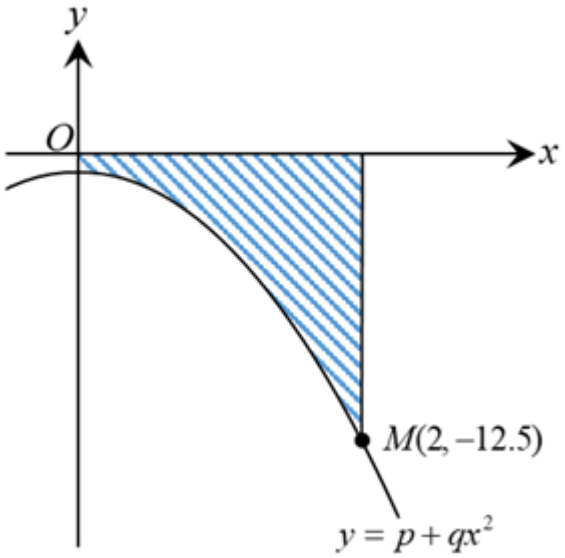
[6 markah]

[6 *marks*]

Jawapan / *Answer* :

Sumber : Ticket To Victory 1 | Kertas 2 | Set 2 | Soalan 9

3 Rajah 3 menunjukkan suatu kawasan berlorek di bawah lengkung $y = p + qx^2$, dengan keadaan p dan q ialah pemalar.
Diagram 3 *shows a shaded region under the curve* $y = p + qx^2$, *where p and q are constants*.



Rajah 3
Diagram 3

Diberi bahawa luas kawasan berlorek itu ialah 9 unit^2. Cari
Given that the area of the shaded region is 9 unit^2. *Find*

(*a*) nilai p dan nilai q.
the values of p and of q. [4 markah]
[4 *marks*]

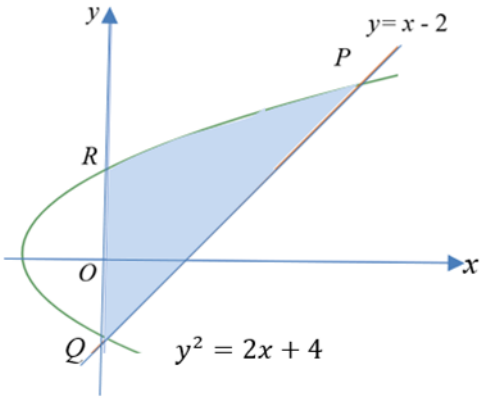
(*b*) persamaan tangen pada M,
the equation of the tangent at M, [3 markah]
[3 *marks*]

(*c*) isipadu yang dijanakan, dalam sebutan π, apabila rantau yang dibatasi oleh lengkung, paksi-y dan garis lurus $y = -2$ diputarkan 360° pada paksi-y.
the volume of revolution, in terms of π, *when the region bounded by the curve, the y-axis and the straight line* $y = -2$ *is revolved through* 360° *about the y-axis.*
[3 markah]
[3 *marks*]

Jawapan / *Answer* :

Sumber : Ticket To Victory 1 | Kertas 2 | Set 3 | Soalan 9

4 Rajah 4 menunjukkan sebahagian lengkung $y^2 = 2x + 4$ dan garis lurus $y = x - 2$ yang bersilang di titik $P(6,4)$ dan $Q(0,-2)$.
The diagram 4 shows part of the curve $y^2 = 2x + 4$ *and the straight line* $y = x - 2$ *intersecting at points* $P(6,4)$ *and* $Q(0,-2)$.



Rajah 4
Diagram 4

(a) Tunjukkan koordinat bagi R ialah (0,2)
Show that the coordinate of R is (0,2)

[2 markah]
[2 *marks*]

(b) Cari luas rantau berlorek.
Find the area of the shaded region.

[3 markah]
[3 *marks*]

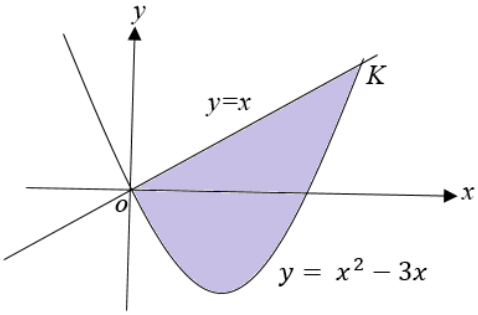
(c) Cari isi padu kisaran , dalam sebutan π, apabila rantau yang dibatasi oleh lengkung dan paksi-y dikisarkan melalui 180° pada paksi$-x$.
Find the volume of revolution, in terms of π, *when the region bounded by the curve and the* $y -$ *axis is revolved through* 180° *about the* $x -$ *axis.*

[3 markah]
[3 *marks*]

Jawapan/ *Answer* :

Sumber : Ticket To Victory 2 | Kertas 2 | Set 1 | Soalan 7

5 Rajah 5 menunjukkan garis lurus $y = x$ bersilang dengan lengkung $y = x^2 - 3x$ pada titik O dan K
Diagram 5 shows the straight line $y = x$ intersecting the curve $y = x^2 - 3x$ at the point O and K.



Rajah 5
Diagram 5

Cari / *Find*

(a) Koordinat bagi titik K, Seterusnya cari luas rantau berlorek
the coordinates of point K, hence find the area of the shaded region

[7 markah]
[7 *marks*]

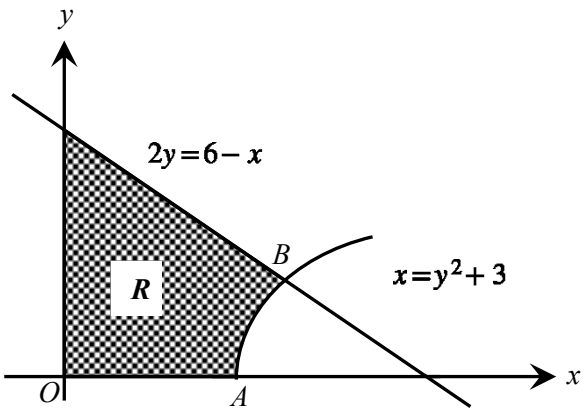
(b) Seterusnya, cari isipadu yang dijanakan dalam sebutan π apabila rantau yang dibatasi oleh lengkung $y = x^2 - 3x$ dan paksi x dikisarkan melalui $180°$ pada paksi x
Hence, find the volume generated, in term of π , when the region bounded by the curve $y = x^2 - 3x$ and x-axis is revolved through $180°$ about the x-axis

[3 markah]
[3 *marks*]

Jawapan/ A*nswer* :

Sumber : Ticket To Victory 2 | Kertas 2 | Set 2 | Soalan 8

6 Rajah 6 menunjukkan lengkung $2y = 6 - x$ bersilang dengan garis lurus $x = y^2 + 3$ pada titik B dan paksi-x pada titik A.
Diagram 6 shows the curve $2y = 6 - x$ *intersects the straight line* $x = y^2 + 3$ *at B and the x-axis at point A.*



Rajah 6
Diagram 6

Cari
Find

(*a*) koordinat titik *B*, [3 *markah*]
the coordinates of point B, [3 *marks*]

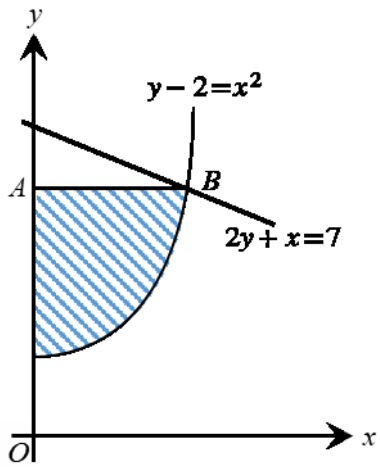
(*b*) luas rantau berlorek R, [4 *markah*]
the area of the shaded region R, [4 *marks*]

(*c*) isipadu yang dijanakan, dalam sebutan π, apabila rantau yang dibatasi oleh lengkung $x = y^2 + 3$, garis lurus $x = 4$ dan paksi -*x* dikisarkan melalui 360° pada paksi-x.
the volume generated, in terms of π, *when the region bounded by the curve* $x = y^2 + 3$, *the straight line* $x = 4$ *and the x-axis is revolved through* 360° *about the x-axis.*
[3 *markah*]
[3 *marks*]

Jawapan / *Answer* :

Sumber : Modul Gempur | Kertas 2 | Set 1 | Soalan 8

7 Rajah 7 menunjukkan garis lurus $2y+x=7$ yang menyilang sebahagian daripada lengkung $y-2=x^2$ pada titik *B*. Garis lurus *AB* adalah selari dengan paksi-*x*.
Diagram 7 shows the straight line $2y+x=7$ *intersecting the part of the curve* $y-2=x^2$ *at the point B. The straight line AB is parallel to the x-axis.*



Rajah 7
Diagram 7

Cari
Find

(a) koordinat titik *B*,
the coordinates of point B,

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

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

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

(c) isipadu kisaran, dalam sebutan π, apabila rantau yang berlorek diputarkan melalui 360° pada paksi-*y*.
the volume of revolution, in terms of π, *when the shaded region is rotated through* 360° *about the y-axis.*

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

Jawapan / *Answer* :

Sumber : Modul Gempur | Kertas 2 | Set 2 | Soalan 8