

INSTRUCTION :

This section consists of **FOUR (4)** structured questions. Answer **ALL** questions.

ARAHAN :

Bahagian ini mengandungi EMPAT (4) bahagian berstruktur. Jawab SEMUA soalan.

QUESTION 1**SOALAN 1**CLO1
C2

a) Find $\frac{dy}{dx}$ for the following functions.

Carikan $\frac{dy}{dx}$ untuk fungsi tersebut.

i. $y = 5x^4$ [2 marks]

[2 markah]

ii. $y = 2x^3 + 4x^2 - 5$ [3 marks]

[3 markah]

CLO1
C3

b) Differentiate each of the following functions with respect to x . by using the stated method.

Bezakan setiap fungsi berikut terhadap x . menggunakan kaedah yang dinyatakan.

i. $y = (3x^2 - 1)^3$ - Extended Power Rule [4 marks]

[4 markah]

ii. $y = (2x + 2)(3 - x)^2$ - Product Rule [5 marks]

[5 markah]

iii. $y = \frac{(3x + 2)^3}{x^4}$ - Quotient Rule [6 marks]

[6 *markah*]CLO1
C3

c) Given $y = 3x^4 - 5x^3 + x^2$, find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$. [5 marks]

Diberi $y = 3x^4 - 5x^3 + x^2$, dapatkan $\frac{dy}{dx}$ dan $\frac{d^2y}{dx^2}$. [5 *markah*]

QUESTION 2

SOALAN 2

CLO1
C3

- a) Find the gradient for each of the following curves at the point given.

Dapatkan kecerunan bagi setiap persamaan lengkung pada titik yang diberikan.

i. $y = x^2 + 3x$ at point (2,0) [2 marks]

[2 markah]

ii. $y = 2x^3 - x^2 + 1$ at point (1,2) [3 marks]

[3 markah]

- iii. Find the gradient and the equation of tangent for $y = x^3 - 4x$ at point (1,-3). [6 marks]

Dapatkan kecerunan dan persamaan tangen bagi $y = x^3 - 4x$ pada titik (1,-3).

[6 markah]

- iv. Given the stationary point of $y = 5x^2 - 2$ is (0, -2), hence, determine whether this stationary point is a maximum or a minimum. [4 marks]

Diberi titik pegun bagi lengkungan $y = 5x^2 - 2$ ialah (0, -2), oleh itu, tentukan samada titik pegun tersebut adalah titik maksimum atau minimum.

[4 markah]

CLO1
C3

- b) An object is moving along a straight line with position $s = 2t^3 - 3t^2 + 15t + 6$ (s in meter and time in seconds). Find :

Sebuah objek bergerak dalam keadaan lurus dengan sesarannya ialah

$s = 2t^3 - 3t^2 + 15t + 6$ (s dalam meter dan masa dalam saat). *Cari :*

- i. The displacement, s of an object when $t = 1$ second. [2 marks]
Sesaran objek ketika masa $t = 1$ saat. [2 markah]
- ii. The velocity, v of an object when $t = 2$ seconds. [4 marks]
Kelajuan objek ketika masa $t = 2$ saat. [4 markah]
- iii. The acceleration when $t = 3$ seconds. [4 marks]
Pecutan ketika masa $t = 3$ saat. [4 markah]

QUESTION 3

SOALAN 3

- CLO2
C2
- a) Integrate each of the following with respect to x :
Kamirkan setiap yang berikut terhadap x :
- i. $\int 5x \, dx$ [2 marks]
[2 markah]
- ii. $\int 3x^2 + 2 \, dx$ [3 marks]
[3 markah]
- CLO2
C3
- b) Solve each of the following integrals :-
Selesaikan setiap kamiran yang berikut :-
- i. $\int (2x + 3)^4 \, dx$ [4 marks]
[4 markah]
- ii. $\int 3(4x - 1)^{-3} \, dx$ [5 marks]
[5 markah]
- iii. $\int \frac{5}{(1 - 3x)^4} \, dx$ (Substitution method) [6 marks]
[6 markah]
- CLO2
C3
- c) Evaluate $\int^2 4x^3 + 3x^2 - 2 \, dx$ [5 marks]
Nilaikan $\int^2 4x^3 + 3x^2 - 2 \, dx$ [5 markah]

QUESTION 4
SOALAN 4

CLO2
C3

- (a) i. Figure 4(a)(i) shows the area bounded by the straight line $y = 2x$ on x - axis. Find the area of the shaded region.

Rajah 4(a)(i) menunjukkan luas kawasan yang dilingkungi oleh garis lurus $y = 2x$ pada paksi - x . Cari luas kawasan berlorek.

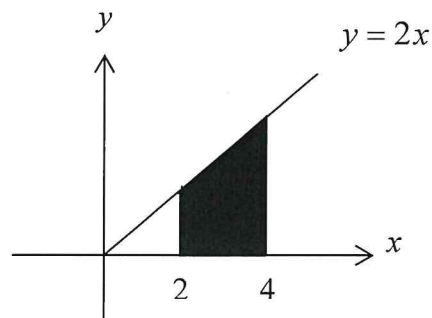


Figure 4(a)(i) / Rajah 4(a)(i)

[5 marks]

[5 markah]

- ii. Find the area of a region bounded by the curve $y = 1 - x^2$, the x - axis, $x = -1$ and $x = 1$ on Figure 4(a)(ii).

Cari luas kawasan yang dilingkungi oleh lengkung $y = 1 - x^2$, paksi - x , $x = -1$ dan $x = 1$ pada Rajah 4(a)(ii).

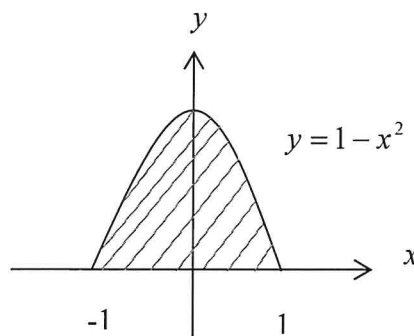


Figure 4(a)(ii) / Rajah 4(a)(ii)

[5 marks]

[5 markah]

- iii. Find the area of a region bounded by the curve, $x = y^2$, the y - axis, the line $y = 0$ and $y = 2$.

Cari luas kawasan yang dilingkungi oleh lengkung, $x = y^2$, paksi - y , pada $y = 0$ and $y = 2$.

[5 marks]

[5 markah]

CLO2
C3

- b) Find the generated volume by the curve $y = x(1 - x)$, $y = 0$, $x = 0$ and $x = 1$ that rotated through 360° on x - axis on Figure 4(b).

Cari isipadu janaan yang dilingkungi oleh lengkung $y = x(1 - x)$, $y = 0$, $x = 0$ dan $x = 1$ diputarakan 360° di paksi - x pada Rajah 4(b).

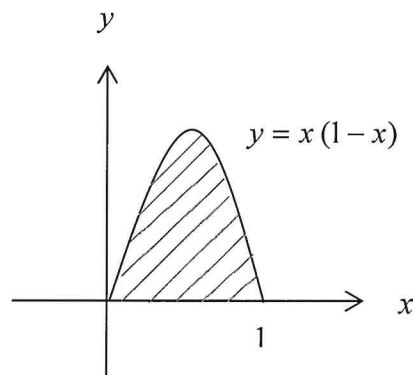


Figure 4(b) / Rajah 4(b)

[10 marks]

[10 markah]

SOALAN TAMAT

FORMULA PBM2024 – ADVANCED MATHEMATICS 2

DIFFERENTIATION			
1.	$y = ax$ $\frac{dy}{dx} = a$	5.	$y = ax^n$ $\frac{dy}{dx} = n \times ax^{n-1}$
2.	Chain Rule: $y = (ax + b)^n$ $u = ax + b$ $y = u^n$ $\frac{dy}{dx} = \frac{du}{dx} \times \frac{dy}{du}$	6.	Extended Power Rule: $y = (ax + b)^n$ $\frac{dy}{dx} = n \times (ax + b)^{n-1} \times \frac{d}{dx}(ax + b)$
3.	Product Rule: $y = (ax + b)^n (cx + d)^n$ $\frac{dy}{dx} = u \cdot \frac{dv}{dx} + v \cdot \frac{du}{dx}$	7.	Quotient Rule: $y = \frac{(ax + b)^n}{(cx + d)^n}$ $\frac{dy}{dx} = \frac{v \cdot \frac{du}{dx} - u \cdot \frac{dv}{dx}}{(v)^2}$
4.	Velocity: $v = \frac{ds}{dt}$	8.	Acceleration: $a = \frac{d^2s}{dt^2}$
INTEGRATION			
1.	$\int a \, dx = ax + C$, a is any constant	5.	Area Between Curve and x – axis: $A = \int_a^b y \, dx$
2.	$\int ax^n \, dx = \frac{ax^{n+1}}{n+1} + C$, $\{n \neq -1\}$	6.	Area Between Curve and y – axis: $A = \int_a^b x \, dy$
3.	$\int (ax + b)^n \, dx = \frac{(ax + b)^{n+1}}{(a)(n+1)} + C$	7.	Area between curve and line/curve about x - axis: $A = \int_a^b [f(x) - g(x)] \, dx$
4.	$\int_a^b f(x) \, dx = [F(x)]_a^b = F(b) - F(a)$	8.	Area between curve and line/curve about y - axis: $A = \int_a^b [f(y) - g(y)] \, dy$
9.	Volume revolved 360° along x – axis: $V = \pi \int_a^b [R(x)]^2 \, dx$		
QUADRATIC FORMULA			
$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$			