

SULIT



**BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENDIDIKAN MALAYSIA**

JABATAN MATEMATIK, SAINS & KOMPUTER

PEPERIKSAAN AKHIR

SESI JUN 2018

PBM2024: ADVANCED MATHEMATICS 2

TARIKH : 27 OKTOBER 2018

MASA : 8.30 PAGI - 10.30 PAGI (2 JAM)

Kertas ini mengandungi **TUJUH (7)** halaman bercetak.

Struktur (4 soalan)

Dokumen sokongan yang disertakan : Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT

INSTRUCTION:

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

ARAHAN:

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

QUESTION 1**SOALAN 1**CLO1
C2

(a) Determine $\frac{dy}{dx}$ for the following functions:

Tentukan $\frac{dy}{dx}$ untuk fungsi berikut.

i. $y = 7x^2 - 4x + 2$

[2 marks]
[2 markah]

ii. $y = 3 - \frac{4}{x^3} + \sqrt{x}$

[3 marks]
[3 markah]

CLO1
C3

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

Bezakan setiap fungsi berikut terhadap x menggunakan kaedah yang diberi.

i. $y = 3(7x + 1)^4$ (Chain rule)

[4 marks]
[4 markah]

ii. $y = (5x + 7)(2x + 3)$ (Product rule)

[5 marks]
[5 markah]

iii. $y = \frac{x^2}{5x + 1}$ (Quotient rule)

[6 marks]
[6 markah]

CLO1
C3(c) Given $y = 27x^4 - 21x^3 + 20x - 31$, find:*Diberi $y = 27x^4 - 21x^3 + 20x - 31$, dapatkan:*

i. $\frac{dy}{dx}$

[3 marks]

[3 markah]

ii. $\frac{d^2y}{dx^2}$

[2 marks]

[2 markah]

QUESTION 2

SOALAN 2

CLO1
C3

- (a) i. Calculate the gradient of the tangent for the curve $y = 7 - \frac{4}{x^2}$ at point $(-2, 6)$.

Kira kecerunan tangen bagi lengkung $y = 7 - \frac{4}{x^2}$ pada titik $(-2, 6)$.

[4 marks]

[4 markah]

- ii. The gradient of tangent of the curve $y = ax^2 + b$ at the point $(2, 7)$ is 8, where a and b are constants. Calculate the value of a and b .

Kecerunan tangen bagi lengkung $y = ax^2 + b$ pada titik $(2, 7)$ ialah 8, di mana a dan b adalah pemalar. Kira nilai a dan b .

[5 marks]

[5 markah]

- iii. Find the equation of tangent to the curve of $y = 5x^2 - x + 3$ at $x = 1$.

Cari persamaan tangen untuk $y = 5x^2 - x + 3$ pada $x = 1$.

[6 marks]

[6 markah]

CLO1
C3

- (b) i. Find the coordinate of stationary point of the curve $y = x^2 + 8x - 2$ and then determine whether that point is maximum or minimum.

Cari koordinat bagi titik pegun untuk lengkungan $y = x^2 + 8x - 2$ dan tentukan sama ada titik tersebut adalah maksimum atau minimum.

[6 marks]

[6 markah]

- ii. A particle is moving in a straight line from the fixed point O in the position $s = 4t^3 - 2t^2 - t + 3$ in meter and the time interval in seconds. Calculate the velocity and the acceleration of the particle at the time $t = 2$ sec.

Satu zarah bergerak secara lurus daripada titik tetap O pada kedudukan $s = 4t^3 - 2t^2 - t + 3$ dalam meter dan selang masa adalah dalam saat. Kirakan kelajuan dan pecutan zarah itu pada masa $t = 2$ sec.

[4 marks]

[4 markah]

QUESTION 3

SOALAN 3

CLO2
C2

- (a) Find the following integrals:

Cari pengamiran yang berikut:

i. $\int (x-5) dx$

[2 marks]

[2 markah]

ii. $\int (2x^5 - 5x^3) dx$

[3 marks]

[3 markah]

CLO2
C3

- (b) Integrate the following functions:

Kamirkan persamaan yang berikut:

i. $\int \frac{5}{(3x+2)^3} dx$

[5 marks]

[5 markah]

ii. $\int (3x-3)(x+2) dx$

[5 marks]

[5 markah]

iii. $\int \frac{2x^6 - 3x^5 + 4x^3}{x} dx$

[5 marks]

[5 markah]

CLO2
C3(c) Calculate $\int (1-3x)^3 dx$ by using substitution method.*Kirakan $\int (1-3x)^3 dx$ dengan menggunakan kaedah penggantian.*

[5 marks]

[5 markah]

QUESTION 4**SOALAN 4**CLO2
C3a) i. Calculate the area of a region bounded by the curve $y = x^2 - 2x$, the x -axis and the lines $x = 0$ dan $x = 2$.*Kira luas kawasan yang dilingkungi oleh lengkung $y = x^2 - 2x$, paksi- x dan garis $x = 0$ dan $x = 2$.*

[7 marks]

[7 markah]

ii. Calculate the area of a region bounded by the curve $y^2 = x + 1$, the y -axis and the lines $y = 0$ and $y = 1$.*Kira luas kawasan yang dilingkungi oleh lengkung $y^2 = x + 1$, paksi- y dan garis $y = 0$ dan $y = 1$.*

[8 marks]

[8 markah]

CLO2
C3

- b) Calculate the volume generated (in terms of π) when the region bounded by the curve $y = 12x^2 - 12$, the x -axis and the straight line $x = 1$ and $x = -1$ is rotated 360° about the x -axis.

Kira isipadu janaan (dalam sebutan π) apabila lengkung $y = 12x^2 - 12$, paksi x dan garis lurus $x = 1$ dan $x = -1$ diputar 360° pada paksi- x .

[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			
$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$			