SAMPEL PERCUMA

Kertas Percubaan STPM Penggal 1 Mathematics M

Set penuh: Kertas Percubaan STPM

Sem 1 · Mathematics M

Sampel ini: 4 muka surat. Set penuh ada:

- 3 fail PDF
- Semester 1: kertas percubaan (trial) negeri, subjek yang dipilih + skema
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Sampel bermula di muka surat sebelah

MODUL PENTAKSIRAN PDPC SEMESTER1 MODUL PENTAKSIRAN PDPC SEMESTER 1

950/1 **STPM 2024**

MATHEMATICS (M) [MATEMATIK (M)]

PAPER 1 (KERTAS 1)

One and a half hours (Satu jam setengah)

MODUL PENTAKSIRAN PDPC SEMESTER1 MODUL PENTAKSIRAN PDPC SEMESTER 1

MODUL PENTAKSIRAN PDPC

SEMESTER 1

Instructions to candidates:

DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE ALLOWED TO DO SO.

Answer **all** *questions in Section A.*

Answer **one** *question only in Section B.*

Write the answers in the answer sheets provided. Begin each answer on a new page of the answer sheet. All working should be shown.

Scientific calculators may be used. Programmable and graphic display calculators are ***not*** *allowed.*

Answers may be written in either English or Malay.

This question paper consists of 5 printed pages

Section A [45 *marks*]

Answer **all** the questions

1) The polynomial $P_1(x) = x^3 + ax^2 + bx + 6$ has a factor $(x - 2)$ and a remainder R_1 when divided by $(x - 1)$, while the polynomial $P_2(x) = x^3 - 4ax^2 + bx - 7$ has a remainder R_2 when divided by $(x - 1)$. Find the values of the constants a and b if $R_2 - R_1 = 7$. Hence, find the roots for $P_1(x)$.

[7 *marks*]

2 a) Expand $(1 - \frac{x}{2})^{\frac{1}{4}}$ in ascending powers of x up to the term in x^3 and state the interval of x for which the expansion is valid. [3 *marks*]

b) From 2(a), express $\sqrt[4]{16 - 8x}$ in the form $a(1 - \frac{x}{2})^{\frac{1}{4}}$, where a is an integer.

[2 *marks*]

c) Hence, by substituting a suitable value for x, evaluate $\sqrt[4]{15.92}$ correct to two decimal places.

[3 *marks*]

3) Matrix A is given by A = $\begin{pmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 1 & 1 & 2 \end{pmatrix}$. Find *m* and *n* for which $A^2 + mA + nI = 0$, where I and 0 are 3 x 3 identity and zero matrix respectively. Hence, deduce A^3 and A^{-1}.

[9 *marks*]

4 a) Find the derivatives of f(x) =$\frac{3}{2\sqrt{x}}$ using the first principles.

[4 *marks*]

b) If $y^3 - 3x^2y = 6x$, show that $(y^2 - x^2)\frac{d^2y}{dx^2} + 2y\,(\frac{dy}{dx})^2 - 4x\frac{dy}{dx} = 2y$

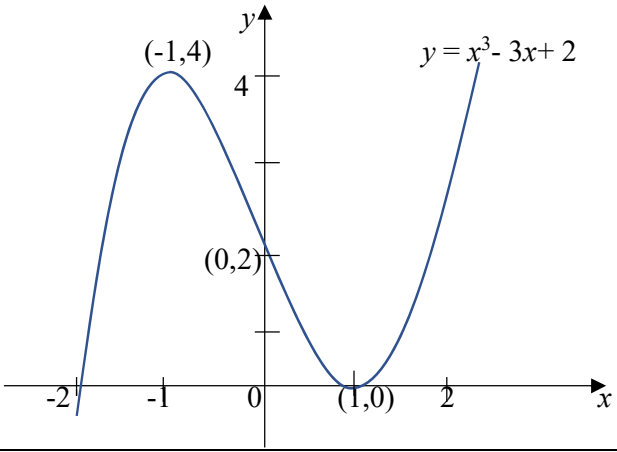
[4 *marks*]

5) Shade the region bounded by the curve $y = 2e^{-x}$, $y = x^2$, the line $x = \frac{1}{2}$ and the y-axis. Determine the area bounded by the curves and lines.

[7 *marks*]

6) Solve $\frac{1}{2}\frac{dy}{dx} - \frac{2}{x}y = x^5 e^{x^2}$

[6 *marks*]

8	a) When $x = 0$, $y = 2 \rightarrow$ y-intercept = 2	A1
	When $y = 0$, $(x - 1)^2 (x + 2) = 0$ x-intercept = 1 and -2	A1
	b) $\frac{dy}{dx} = 3x^2 - 3$	M1
	For turning points, $\frac{dy}{dx} = 0$ $(x+1)(x-1) = 0$	M1
	$x = -1$ or $x = 1$ $\frac{d^2y}{dx^2} = 6x$	M1
	When x = -1, y = -1 + 3 + 2= 4 , $\frac{d^2y}{dx^2}$= -6 (< 0) maximum point When x = 1, y= 1 -3+2 = 0 , $\frac{d^2y}{dx^2}$= 6 (> 0) minimum point Maximum point = (-1, 4) and minimum point = (1, 0)	M1 A1A1
	When $\frac{d^2y}{dx^2} = 0$, $6x = 0$ ($\frac{d^3y}{dx^3} = 6 \neq 0$) $x = 0$ When $x = 0$, $y = 2$ Inflexion point = (0, 2)	M1 A1
	c) $\frac{dy}{dx} = 3x^2 - 3$ $= 3(x + 1)(x - 1)$ y is increasing on $(-\infty, -1)$ and $(1, \infty)$ y is decreasing on (-1, 1)	A1 A1
	d)When $x \rightarrow +\infty, y \rightarrow +\infty$ When $x \rightarrow -\infty, y \rightarrow -\infty$  	D1D1D1

TAMAT SAMPEL

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