UNIVERSITI SAINS MALAYSIA

First Semester Examination
Academic Session 2004/2005

October 2004

IUK 191E – MATHEMATICS I
[Matematik I]

Duration : 3 hours
[Masa : 3 jam]

Please check that the examination paper consists of FOUR pages of printed material before you begin the examination.

[Sila pastikan bahawa kertas peperiksaan in mengandungi EMPAT muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]

Instructions: Answer **FIVE** questions. Students are allowed to answer all questions in English OR Bahasa Malaysia OR combination of both.

*[**Arahan:** Jawab **LIMA** soalan. Semua soalan boleh dijawab dalam Bahasa Inggeris ATAU Bahasa Malaysia ATAU kedua-duanya.]*

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1. Use any method to find the relative extrema of the function

$$f(x) = |x^2 - 4|$$

(20 marks)

1. Gunakan sebarang kaedah untuk mencari ekstremum relatif bagi fungsi

$$f(x) = |x^2 - 4|$$

(20 markah)

2. (a) Find the domain of the function

$$f(x) = \ln(4 - x^2)$$

(10 marks)

(b) Find

$$\lim_{h \to 0} \frac{h}{\tanh}$$

(10 marks)

2. (a) Cari domain bagi fungsi

$$f(x) = \ln(4 - x^2)$$

(10 markah)

(b) Cari

$$\lim_{h \to 0} \frac{h}{\tanh}$$

(10 markah)

3. (a) Use Cramer's rule to solve

$$x_1 + 2x_2 + x_3 = 5$$
$$3x_1 - x_2 - x_3 = -1$$
$$2x_1 + 3x_2 + x_3 = 4$$

(15 marks)

(b) $\int_0^1 \tan^{-1} x \; dx$

(5 marks)

3. *(a) Gunakan aturan Cramer untuk menyelesaikan*

$$x_1 + 2x_2 + x_3 = 5$$
$$3x_1 - x_2 - x_3 = -1$$
$$2x_1 + 3x_2 + x_3 = 4$$

(15 markah)

(b) $\int_0^1 \tan^{-1} x \; dx$

(5 markah)

4. (a) Evaluate

$$\int x^2 \sqrt{x-1} \; dx$$

(5 marks)

(b) Find the arc length of the curve $y = 2\sqrt{x}$ from $x = 1$ to $x = 4$

(15 marks)

4. *(a) Nilaikan*

$$\int x^2 \sqrt{x-1}\, dx$$

(5 markah)

(b) Cari panjang arc bagi kurva $y = 2\sqrt{x}$ dari $x = 1$ kepada $x = 4$

(15 markah)

5. Solve the following differential equation

$$\frac{dy}{dx} = \frac{x^3}{(1+x^4)y}$$

(20 marks)

5. *Selesaikan persamaan diferensial berikut*

$$\frac{dy}{dx} = \frac{x^3}{(1+x^4)y}$$

(20 markah)

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