UNIVERSITI SAINS MALAYSIA

Peperiksaan Semester Kedua
Sidang Akademik 2002/2003

Februari 2003

IUK 191/4 – MATEMATIK

Masa : 3 jam

Sila pastikan bahawa kertas peperiksaan ini mengandungi ENAM (6) mukasurat yang bercetak sebelum anda memulakan peperiksaan ini.

Jawab **EMPAT (4)** soalan. Semua soalan boleh dijawab samada dalam Bahasa Inggeris ATAU Bahasa Malaysia ATAU kombinasi kedua-duanya.

1. (a) Find the domain and range of

$$f(x) = 2 + \sqrt{x-1}$$

(40 marks)

Cari domain dan julat bagi

$$f(x) = 2 + \sqrt{x-1}$$

(b) Find the limit

$$\lim_{x \to -1} \frac{x^2 + 6x + 5}{x^2 - 3x - 4}$$

(30 marks)

Cari had bagi

$$\lim_{x \to -1} \frac{x^2 + 6x + 5}{x^2 - 3x - 4}$$

(c) Find the point of discontinuity, if any, for the function

$$f(x) = x^3 - 2x + 3$$

(30 marks)

Cari titik pisah, jika ada, bagi fungsi berikut

$$f(x) = x^3 - 2x + 3$$

2.   (a)   Find $\dfrac{dy}{dx}$

           $f(x) = [x \; \sin x + \tan^4(x^7)]^5$ (20 marks)

          Cari $\dfrac{dy}{dx}$

           $f(x) = [x \; \sin x + \tan^4(x^7)]^5$

   (b)   Find the intervals on which f is

         i.   increasing   ii.   decreasing

         and find the intervals on which f is

         iii.   concave up   iv.   concave down

         v.   find the point of inflection.

            $f(x) = x^2 - 5x + 6$ (60 marks)

         Cari jeda bagi f *yang*

         i.   *bertambah*   *ii.*   *mengurang*

         dan tentukan jeda bagi f *yang*

         iii.   *cekung ke atas*   *iv.*   *cekung ke bawah*

         v.   *cari titik infleksi ke bawah*

            $f(x) = x^2 - 5x + 6$

(c) Sketch the function

$$f(x) = \frac{x}{x-2}$$
  (20 marks)

Lakarkan fungsi

$$f(x) = \frac{x}{x-2}$$

3. (a) Find the volume of the solid that is obtained when the region under the curve $y = \sqrt{x}$ over the interval [1,4] is revolved about the x – axis.

  (25 marks)

Tentukan isipadu pepejal yang didapati apabila kawasan di bawah lengkung $y = \sqrt{x}$ bagi jeda [1, 4] diputar pada paksi x.

(b) Find the length of the curve
$y = x^{3/2}$ from (1,1) to (2,2 $\sqrt{2}$).

  (25 marks)

Kira panjang lengkung

$y = x^{3/2}$ *dari (1,1) ke (2,2 $\sqrt{2}$).*

- 5 -

[IUK 191/4]

(c) Find

1. $\int \frac{3}{2} x \sqrt{x^2 - 4}\, dx$

2. $\int \sin^5 x \, \cos^3 x\, dx$

(50 marks)

Cari

1. $\int \frac{3}{2} x \sqrt{x^2 - 4}\, dx$

2. $\int \sin^5 x \, \cos^3 x\, dx$

4. (a) Solve the system

$x + 4y = 2$
$2x - y = -1$
$2x + 5y = 3$

(40 marks)

Selesaikan sistem ini

$x + 4y = 2$
$2x - y = -1$
$2x + 5y = 3$

(b) Determine whether the series

$$\sum_{k=1}^{\infty} \frac{1}{k!}$$

converges or diverges, using ratio test

(30 marks)

Tentukan samada siri ini

$$\sum_{k=1}^{\infty} \frac{1}{k!}$$

menumpu atau mencapah dengan menggunakan ujian nisbah

(c)   Solve the equation

$$x(y-1)\frac{dy}{dx} = y$$

(30 marks)

Selesaikan persamaan ini

$$x(y-1)\frac{dy}{dx} = y$$

- oooOooo -