MATH1003

ASSIGNMENT 8

Suggested practice questions (the answers are in the back of the textbook):

- *§4.1; 1, 3, 15, 29, 33, 47, 55, 63, 75, 77.*

1. Calculate:

$$\lim_{\theta \to \pi/2} \frac{1 - \sin\theta}{\csc\theta}.$$

2. Prove the following result:

Proposition. *For any $\rho > 0$,*

$$\lim_{x \to \infty} \frac{\ln x}{x^\rho} = 0.$$

3. Find the critical numbers of :

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

(ii) $g(\theta) = 4\theta - \tan\theta$.

4. Find the global maximum and global minimum values of the following functions on the given intervals:

(i) $f(x) = x^3 - 6x^2 + 9x + 2$ on the interval $[-1, 4]$,

(ii) $f(x) = 2x^3 - 3x^2 - 12x + 1$ on the interval $[-2, 3]$,

(iii) $f(x) = (x^2 - 1)^3$ on the interval $[-1, 2]$,

(iv) $f(x) = xe^{-x}$ on the interval $[0, 2]$.

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