MATH1003

ASSIGNMENT 7

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

- *§3.5; 1, 3, 13, 25, 29.*
- *§3.6; 3, 17, 23, 37, 39.*
- *§3.11; 3, 9, 23, 31, 33.*

1. (i) By using logarithmic differentiation, find $\dfrac{dy}{dx}$ for $y = (x+2)^{10}(2x-3)^4$.

(ii) Show that the derivative of:

$$y = \frac{(x+1)^4}{\sqrt{x^2-1}}$$

is given by:

$$y' = \frac{(3x-4)(x+1)^4}{(x^2-1)^{3/2}}.$$

2. Find the derivative of the following functions:

(i) $y = e^{\cosh 3x}$,

(ii) $y = \sinh \cosh x$,

(iii) $y = x^2 \sinh^{-1} 2x$,

(iv) $y = \ln \sinh x$.

3. Find an expression for $\dfrac{dy}{dx}$ for the following curves. In each case, prove that the tangent to the curve is never parallel to the x-axis.

(i) $x^2 - y^2 = 1$,

(ii) $x^2 + y^2 = (1+xy)^2$.

4. (i) Let $f(x) = 1/(5x-1)$. Find an expression for $f^{(n)}$, where n is a positive integer.

(ii) Let $h(\theta) = \theta e^{-\theta}$. What is $h^{(n)}(0)$?

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