DAWSON COLLEGE

Mathematics Department

Final Examination

Engineering Mathematics II (201-942-DW)

May 16, 2011

Instructor: N. Sabetghadam																							
Time: 3 Hours																							
ID:																							

Instructions:

Print your name and ID in the provided space.

Solve the problems in the space provided for each question and show all your work clearly.

A Formula sheet is attached.

Scienti c non-programmable calculators are permitted.

This examination booklet must be returned intact.

This examination consists of 12 questions. Please ensure that you have a complete examination booklet before starting.

1.(5 marks) Evaluate the following limit.

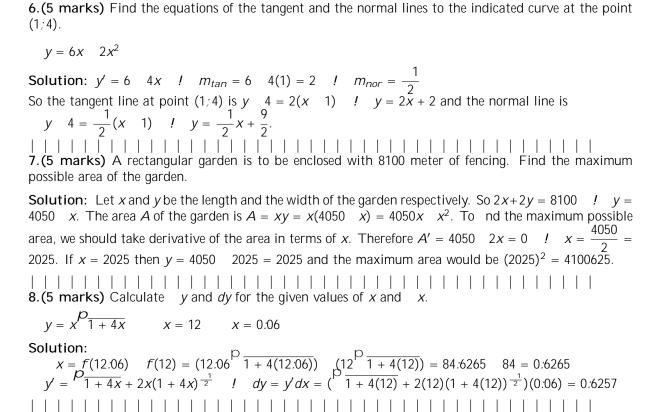
$$\lim_{x \to -1} \frac{x^2}{3x + 3}$$

Solution:
$$\lim_{x \to -1} \frac{x^2}{3x+3} = \lim_{x \to -1} \frac{(x-1)(x+1)}{3(x+1)} = \lim_{x \to -1} \frac{x-1}{3} = \frac{2}{3}$$

$$f(x) = 8x^2 5x + 1$$

$$f(x) = 8x^{2} \quad 5x + 1$$
Solution: $\lim_{h \to 0} \frac{f(x+h) \quad f(x)}{h} = \lim_{h \to 0} \frac{8(x+h)^{2} \quad 5(x+h) + 1 \quad (8x^{2} \quad 5x + 1)}{h} = \lim_{h \to 0} \frac{8x^{2} + 16xh + 8h^{2} \quad 5x \quad 5h + 1 \quad 8x^{2} + 5x \quad 1}{h} = \lim_{h \to 0} \frac{16xh + 8h^{2} \quad 5h}{h} = \lim_{h \to 0} \frac{h(16x + 8h \quad 5)}{h} = \lim_{$

$$f(r) = r(2r+1)^3 h$$



9.(20 marks)

10.(25 marks) Evaluate the following integrals:

(a)
$$(\frac{x^2}{2} + \frac{2}{x^2}) dx$$

Solution:
$$\frac{Z}{(\frac{X^2}{2} + \frac{2}{X^2})dX} = \frac{Z}{(\frac{X^2}{2} + 2X^{-2})dX} = \frac{X^3}{6} \quad 2X^{-1} + C$$

(b)
$$x^3(x^4 + 1)^4 dx$$

Solution:
$$\int_{0}^{Z} x^3(x^4+1)^4 dx = \frac{1}{4} \int_{0}^{Z} 4x^3(x^4+1)^4 dx = \frac{(x^4+1)^5}{20} + C$$

(c)
$$\sin^5 x \cos x dx$$

(d)
$$xe^{-x^2} dx$$

Solution:
$$Xe^{-x^2}dx = \frac{1}{2}Xe^{-x^2}dx = \frac{1}{2}e^{-x^2} + C$$

(e)
$$\frac{Z_{5}}{x}(\frac{1}{x^{0}}+4)dx$$

Solution:
$$\frac{Z}{2} \left(\frac{1}{x} + 4 \right) dx = \frac{Z}{2} \left(x^{-3=2} + 4 \right) dx = \frac{x^{-1=2}}{1=2} + 4x f_2^5 = \frac{Z}{2}$$