DAWSON COLLEGE
Mathematics Department
Final Examination – WITH ANSWERS
Calculus II
201-NYB-05 (REGULAR)
May 26, 2010

1. [28 marks]. Evaluate the following integrals

a) $\int x\sin(2x)\,dx$ (4 Marks)

$-\frac{1}{2}x\cos(2x)+\frac{1}{4}\sin(2x)+c$

b) $\int \frac{x}{(x-1)(x+1)^2}\,dx$ (6 Marks)

$\frac{1}{4}\ln|x-1|-\frac{1}{4}\ln|x+1|-\frac{1}{2(x+1)}+c$

c) $\int \tan(4x)\sec^3(4x)dx$ (4 Marks)

$\frac{1}{12}\sec^3(4x)+c$

d) $\int \frac{\sqrt{x}-1}{\sqrt{x}+1}dx$ (4 Marks)

$(\sqrt{x}+1)^2-6(\sqrt{x}+1)+4\ln|\sqrt{x}+1|+c$

3. (5 Marks) Find the area of the region bounded by the curves

$y = x^2 - x$ and $y = 3x$ as shown in the figure.

Answer: $\frac{32}{3}$

4. (10 Marks) Find the volume of the solid generated when the region enclosed by the graphs of the functions $y = (x-1)^2$ *and* $y = x+1$

5. (5 Marks) Find the arc length of the graph of $y = n(\sec x), \quad 0 \le x \le \frac{\pi}{4}$

$$\frac{\pi}{2} - \tan^{-1}(e)$$

Diverges by nth term Test

11. (5 Marks) Find the Maclaurin polynomial of degree 3 for the function $f(x) = e^x \sin x$

$x + x^2 + \frac{1}{3}x^3$