School of Mathematics and Statistics
Carleton University
Math. 1004A, Fall 2013

MOCK TEST 6

Any non-programmable calculator permitted, 1 blank sheet permitted for roughs

Print Name :

Student Number:

Tutorial Section (A1, A4, ...):

PART I: Multiple Choice Questions

(Choose and CIRCLE only ONE answer - No part marks here.)

1. **[3 marks]** Evaluate $\int_0^\infty 3xe^{-x}\,dx$.

   (a) 3, (b) 0, (c) 1, (d) 4

2. **[3 marks]** Evaluate $\int_0^\infty x^2 3^{-x}\,dx$.

   (a) $\frac{2}{\ln 3}$, (b) 1, (c) $\frac{1}{(\ln 3)^2}$, (d) $\frac{2}{(\ln 3)^3}$

3. **[3 marks]** Evaluate $\int_2^4 \sqrt{x^2-4}\,dx$

   (a) $\sqrt{3} - \ln(2+\sqrt{3})$, (b) $4\sqrt{3} - 2\ln(2+\sqrt{3})$, (c) $12\sqrt{3}$, (d) $4\sqrt{3} - \ln(2+\sqrt{3})$

4. **[3 marks]** Find the area enclosed by the curves $y = 2x^2 - 5$ and $y = 3$.

   (a) 8, (b) $\frac{1}{4}$, (c) $\frac{64}{3}$, (d) $\frac{2}{3}$,

5. **[3 marks]** Evaluate $\int_0^1 \sqrt{1-x^2}\,dx$

   (a) 1, (b) $\frac{\pi}{4}$, (c) $\frac{\pi}{2}$, (d) $\frac{\pi}{3}$,

PART II: Show all work here and give details. No additional pages will be accepted

6. **[10+5 marks]**

   a) Find the volume of the solid of revolution obtained by rotating the region bounded by the lines $x = 1$, $x = 2$, $y = x$ and $y = -x$ about the $y-$axis.

   b) Find an expression for the solid of revolution obtained by rotating the region bounded by the lines $y = 2x$, $y = 3x$ and $x = 1$ about the $x-$axis. DO NOT EVALUATE the constants nor the integral.