School of Mathematics and Statistics
Carleton University
Math. 69.104

TEST 4

Print Name:

Student Number:

This test is out of a **Total of 30**.

PART I: Multiple Choice Questions
(Choose and CIRCLE only ONE answer)

1. **[3 marks]** Evaluate the definite integral $I = \int_0^1 xe^{x^2+1}\,dx$.

   (a) $I = e^2$

   (b) $I = \frac{1}{2}(e^2 - e)$

   (c) $I = 0$

   (d) $I = e - 1$

2. **[3 marks]** Evaluate the indefinite integral $\int (x-1)\,e^{-x}\,dx$.

   (a) The integral diverges
   (b) $xe^{-x} + C$
   (c) $-x\,e^{-x} + C$
   (d) $(x-1)e^x + C$.

3. **[3 marks]** Evaluate the definite integral $\int_0^\pi \sin(x)\,\sin(2x)\,dx$.

   (a) $I = 0$

   (b) $I = \frac{2}{3}$

   (c) $I = -1$

   (d) $I = 12$

4. **[3 marks]** Evaluate $\int_0^\pi \sin(3t)\,dt$.

   (a) $\frac{1}{4}$
   (b) $\frac{1}{3}$
   (c) $\sin t - \frac{\sin 3t}{3} + C$
   (d) $\frac{2}{3}$

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

6. **[5+5+5 marks]** Evaluate the following integrals using any method:

a) $\int x^2 e^{2x}\, dx.$

b) Evaluate $\int \dfrac{x\, dx}{(x-1)(x+2)}$

c) Evaluate $\int e^{2x} \sin 3x\, dx$