MATH 1402A **Term test #3** **7 November 2013**

Total marks: 35 marks

Non-programmable calculators are permitted. This test is closed book.
Supply your answers on this sheet, but TA's have extra paper if you need it.

PLEASE PRINT _____ _____

First name Last name Student number

Please show your work where appropriate!

1. [5] Determine $\int -3x^{-1} - \frac{4}{5\sqrt[5]{x}} + (x+1)^2 - e^x \ dx$

2. [4] Determine $\int 2(2x+1)^3 \ dx$. There are 2 ways to do this; pick one.

3. [4] Determine $\int \frac{e^{\sqrt{x}}+1}{2\sqrt{x}} dx$ (HINT: separate the integrand first, then integrate)

4. Let $F(x) = \int x^{-1} - 2\sqrt[3]{x^2} + x^4 - 2\sqrt[5]{x^4} + 1 \ dx$.

   a. [5] Determine the most general antiderivative $F(x)$.
   b. [2] Determine the constant of integration if $F(-1) = 3$

5. [4] Determine the area under the curve $y = \sqrt[4]{x^3}$ between the values $x = 1$ and $x = 16$. The curve lies above the x axis.

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6. **Profit maximization:** you are given the following information about a firm: the wage rate (***w***) is 200, the rental rate (***r***) is 12.5, the price (***p***) is 240 and production output is given by the model $Q = 2.5\ K^{0.25}\ L^{0.5}$. Use ***any method*** to determine:

a. [4] The values of K and L that maximize profits.	b. [1] The resulting production output Q.	c. [1] The profit Π.

7. [5] Determine the area of the region enclosed between the curves $y = x^2$ and $y = 3x + 4$. It is known that the 2 curves meet at the points (–1, 1) and (4, 16).