due Friday, 30 May, 4pm

Complete the following problems and submit your solutions into the assignment box for your tutorial group. The assignment boxes are located on level three of the Priestley (Mathematics) Building (67), next to the lifts. The boxes are cleary labelled as **MATH1050**, and there is one for each of the tutorial groups T1-T19. Please take care to ensure your assignment is placed in the correct box. Late assignments will be accepted only with a medical certificate or evidence of other exceptional circumstances.

Ensure that your assignment is stapled, and that your name, student number, tutor's name and tutorial group are clearly marked on the front page of your assignment before you hand it in. You do NOT need a cover sheet.

Each of the five assignments will contribute 3% towards your final grade. Although you are encouraged to discuss the assignment questions with your peers, your written assignment must be your own work. Solutions to the assignment will be distributed approximately one week after the due date.

1. A ribbon is to be tied lengthwise and then crosswise around a square-based rectangular present, leaving an extra 30cm length for the bow. If the volume of the present is 2592cm^3, what is the minumum length of ribbon required?

2. Calculate the following:

(a) $\displaystyle\int_1^{e^2} \frac{1}{5x}\,dx$

(b) $\displaystyle\int_\pi^{2\pi} (\sin x + 2)\,dx$

(c) $\displaystyle\int \frac{6x}{x^2-1}\,dx$

(d) $\displaystyle\int_1^2 6x(x^2-1)^3\,dx$

3. Let $f(x) = x^3$.

a) Evaluate the Riemann sum $A_L = \displaystyle\sum_{i=1}^{n} f(x_{i-1})\Delta x$ for $f(x)$ with $1 \le x \le 3$, and taking 20 subintervals.

You can use the following three facts:

$$\sum_{i=1}^{n} i = \frac{n(n+1)}{2} \qquad \sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6} \qquad \sum_{i=1}^{n} i^3 = \frac{n^2(n+1)^2}{4}$$

b) Evaluate the definite integral $\int_1^3 x^3\,dx$. Explain the difference in your answers to a) and b).

4. Let $a = 3+5i$, $b = -2-5i$ and $c = 2-7i$. Write each of the following in Cartesian form.

a) $2a - 3b + c$ **b)** ac **c)** c^2 **d)** $\dfrac{c}{a}$

5. Let $u = 2 - 3i$, $w = -4$ and $z = -3i$. Illustrate each of u, w, z, $\bar{u}$, $\bar{w}$ and $\bar{z}$ on an Argand diagram.

6. Let $w = -3 - 3i$ and $z = 2 + 2\sqrt{3}i$.

a) Write each of w and z in polar form and in exponential form.

b) Use the polar forms of w and z to determine wz, $1/z$ and z/w (in polar form).