due Friday, 2 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. Find the value of x such that $3-x, x, 2-x$ are successive terms of a G.S and state the value of common ratio, r.

2. The numbers x, y, z are successive terms of a G.S with the sum of the three terms equal to 9. When taken in the order, y, x, z the numbers form an A.S. Find the values of x, y, z.

3. Let $\{a_n\}_{n=0}^{14}$ be the sequence of powers of 3 with $a_n = 3^n$. Determine the value of the corresponding series

$$1 + 3 + 9 + \cdots + 4\,782\,969.$$

4. Use mathematical induction to prove that, for all integers $n \geq 1$,

$$\sum_{j=1}^{n} 2^{j-1} = 2^n - 1.$$

5. For each of the following functions, determine its domain and range and sketch its graph.

(a) $c(x) = \sqrt{3-x}$ **(b)** $d(x) = \dfrac{2}{x+1}$

(c) $f(x) = \ln(x+1)$ **(d)** $h(x) = \begin{cases} 2-x & \text{if } x \geq 1 \\ 3 & \text{if } x < 1 \end{cases}$