# MA161 Semester 1, Calculus: Problem Sheet 4

1. Find
   (a) $\log_{10} 1\,000\,000$
   (b) $\log_2 1024$
   (c) $\log_3 6561$
2. Find, correct to 3 decimal places
   (a) $\log_2 15$
   (b) $\log_2 56.25$
   (c) $\log_3 16$
3. If a certain bacteria population starts with $100$ bacteria and doubles every five hours, then the number of bacteria after $t$ hours is given by the function

$$P(t) = 100 \times 2^{t/5}.$$

   When will the population reach $25600$?
4. The isotope Bismuth-210 has a half-life of $5$ days, which means that, compared to time $t$ (in days), only half of the substance remains at time $t + 5$.
   (a) If there are $50$g present at time $t = 0$, show that the quantity remaining at time $t$ can be described by the function

$$f(t) = 50 \times \left(\frac{1}{2}\right)^{t/5}$$

   (b) How many days must pass for the mass to reduce from $50$g to less than $1$g?