Sequences & series

1. The first three terms of a geometric sequence are $u_1 = 1.2$, $u_2 = 3$, and $u_3 = 7.5$.

   (a) Find the value of r.

   [2]

   (b) Find the value of S_6.

   [2]

   (c) Find the least value of n such that $S_n > 300$.

   [3]

2. Three consecutive terms of a geometric sequence are $x - 2$, 6, and $x + 7$.
   Find the possible values of x.

   [6]

3. Find the value of each of the following, giving your answer as an integer.

   (a) $\log_6 36$.

   [2]

   (b) $\log_6 4 + \log_6 9$.

   [2]

   (c) $\log_6 2 - \log_6 12$.

   [3]

4. Solve $\log_2 x + \log_2(x - 2) = 3$, for $x > 2$.

   [7]

5. Let $f(x) = e^{x+3}$.

   (a) i. Show that $f^{-1}(x) = \ln x - 3$.

   [3]

   ii. Write down the domain of f^{-1}.

   (b) Solve the equation $f^{-1}(x) = \ln \frac{1}{x}$.

   [4]

6. Solve the equation $e^x = 4 \sin x$, for $0 \leq x \leq 2\pi$.

   [5]