

Assignment 3.

1. Solve the inequality $(0.8)^x < 0.5$ [3]

2. Given that $(1.25)^x = (2.5)^y$, use logarithms to find the value of $\frac{x}{y}$, correct to 3 significant figures. [3]

3. It is given that $\log_3 z = \log_3(y+2) - 2\log_3 y$, where $y > 0$. Express z in terms of y in a form without logarithms. [3]

4. Find the maximum and minimum value of the function $y = \frac{1}{4^x} - \frac{1}{2^x} + 1$, with $-3 \leq x \leq 2$. [5]

5. Solve the following equations, giving your answer correct to 3 decimal places.

(a) $4^x = 2(3^x)$ [4]

(b) $3^x = 2 + 3^{-x}$

[5]

(c) $3(4^x) - 10(2^x) + 3 = 0$

[5]

6. (†) Given that the inverse function of $f(x)$ is $f^{-1}(x) = \log_2 \frac{1+x}{1-x}$, find the domain and range of $f(x)$. [4]

Total mark of this assignment: 30 + 4.

The symbol (†) indicates a bonus question. Finish other questions before working on this one.