

Higher Homework 1 - Logs and Exponentials

1. If $\log_{10} y = 2x$, choose the correct option for y

A $y = 20x$ **B** $y = x^{100}$ **C** $y = 10^{2x}$ **D** $y = (2x)^{10}$ **2**

2. Evaluate $\log_5 2 + \log_5 50 - 2\log_5 2$ **3**

3. Given that $\log_2(x+1) + \log_2(x-1) = 3$, find the value of x **5**

4. By taking logarithms **in the base three** of both sides of the following equation, find algebraically the value of x

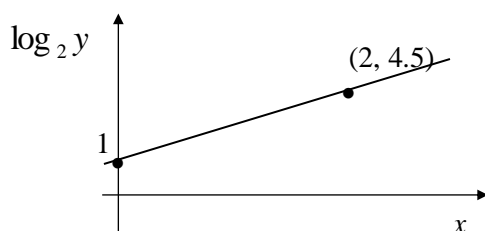
$$27^{x-1} = 9^{2x-4} \quad \mathbf{4}$$

5. A mug of tea cools according to the law $T_t = T_0 e^{-kt}$, Where T_0 is the initial temperature and T_t is the temperature after t minutes.
All temperatures are in $^{\circ}\text{C}$.

(a) A particular mug of tea cools from boiling point to 75°C in a quarter of an hour. Use this information to calculate the value of k **3**

(b) By how many degrees will the temperature of this tea fall in the next quarter of an hour? **3**

6. The results of an experiment give the graph shown below



(a) The graph passes through the points $(1,0)$ and $(2,4.5)$
Write down the equation of this line in terms of x and $\log_2 y$ **2**

(a) Show that x and y satisfy a relationship in the form $y = b(a^x)$,
stating the values of a and b **3**