1. Solve the following equations.

(a) $\log_x 49 = 2$

(3)

(b) $\log_2 8 = x$

(2)

(c) $\log_{25} x = -\frac{1}{2}$

(3)

(d) $\log_2 x + \log_2(x - 7) = 3$

(5)

(Total 13 marks)

2. The population of a city at the end of 1972 was 250 000. The population increases by 1.3% per year.

(a) Write down the population at the end of 1973.

(b) Find the population at the end of 2002.

(Total 6 marks)

3. Find the **exact** value of x in each of the following equations.

(a) $5^{x+1} = 625$

(b) $\log_{\mathbf{a}} (3x + 5) = 2$

(Total 6 marks)

4. Each year for the past five years the population of a certain country has increased at a steady rate of 2.7% per annum. The present population is 15.2 million.

(a) What was the population one year ago?

(b) What was the population five years ago?

(Total 4 marks)

5. A population of bacteria is growing at the rate of 2.3% per minute. How long will it take for the size of the population to double? Give your answer to the nearest minute.

(Total 4 marks)