

1. Solve for the given unknown: (4 marks)

(a)  $5^x = 123$

(b)  $1000 = 2^z$

(c)  $2^{2x+5} = 1$

2. Solve the following logarithms (8 marks)

(a)  $\log_2 64 = x$

(b)  $\log_5 125 = x$

(c)  $\log_2 100 = x$

(d)  $\log_x 121 = 2$

(c)  $\log_3 81 + \log_2 16 = x$

(d)  $\log_2 \sqrt{16} - \log_5 \sqrt[3]{5} = x$

3. Solve for the given unknown: (5 marks)

(a)  $2(3^{x+2}) = 54$

(b)  $-3(5^{x+3}) + 86 = 50$

Formula

$$\log_a m + \log_a n = \log_a mn$$

$$\log_a m - \log_a n = \log_a \left(\frac{m}{n}\right)$$

$$\log_a m^n = n \log_a m$$

$$\log_a \sqrt[n]{m} = \frac{1}{n} \log_a m$$

4. How many years will it take for a \$400 investment to grow to \$1000 with an interest rate of 12%/a compounded monthly? (3 marks)

5. A radioactive isotope has a half of 432 years, determine how long it takes for a sample to degrade to 34% of its original mass. (3 marks)

6. Solve for  $x$ : (3 marks) - Challenge Problem

$$5^{2x} - 4(5^x) = 12.$$

Formula

$$\log_a m + \log_a n = \log_a mn$$

$$\log_a m - \log_a n = \log_a \left(\frac{m}{n}\right)$$

$$\log_a m^n = n \log_a m$$

$$\log_a \sqrt[n]{m} = \frac{1}{n} \log_a m$$