

## Chapter 2 Logarithmic and Exponential functions

Oct/Nov 2002

- 3 (i) Show that the equation

$$\log_{10}(x + 5) = 2 - \log_{10} x$$

may be written as a quadratic equation in  $x$ .

[3]

- (ii) Hence find the value of  $x$  satisfying the equation

$$\log_{10}(x + 5) = 2 - \log_{10} x.$$

[2]

Oct/Nov 2003

- 1 Solve the inequality  $|2^x - 8| < 5$ .

[4]

May/June 2004

- 4 (i) Show that if  $y = 2^x$ , then the equation

$$2^x - 2^{-x} = 1$$

can be written as a quadratic equation in  $y$ .

[2]

- (ii) Hence solve the equation

$$2^x - 2^{-x} = 1.$$

[4]

Oct/Nov 2004

- 2 Solve the equation

$$\ln(1 + x) = 1 + \ln x,$$

giving your answer correct to 2 significant figures.

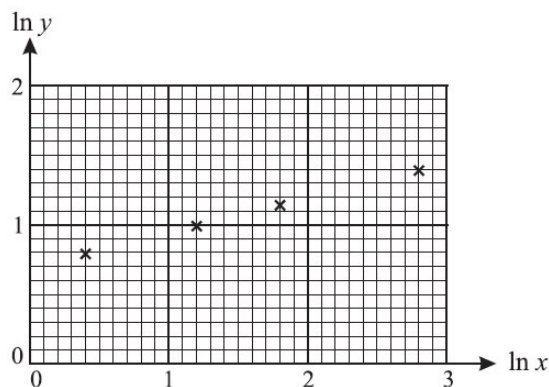
[4]

May/June 2005

- 1 Given that  $x = 4(3^{-y})$ , express  $y$  in terms of  $x$ .

[3]

2



Two variable quantities  $x$  and  $y$  are related by the equation  $y = Ax^n$ , where  $A$  and  $n$  are constants. The diagram shows the result of plotting  $\ln y$  against  $\ln x$  for four pairs of values of  $x$  and  $y$ . Use the diagram to estimate the values of  $A$  and  $n$ .

[5]

May/June 2007

- 4 Using the substitution  $u = 3^x$ , or otherwise, solve, correct to 3 significant figures, the equation

$$3^x = 2 + 3^{-x}. \quad [6]$$

May/June 2008

- 2 Solve, correct to 3 significant figures, the equation

$$e^x + e^{2x} = e^{3x}. \quad [5]$$

Oct/Nov 2008

- 1 Solve the equation

$$\ln(x + 2) = 2 + \ln x,$$

giving your answer correct to 3 decimal places. [3]

May/June 2009

- 1 Solve the equation  $\ln(2 + e^{-x}) = 2$ , giving your answer correct to 2 decimal places. [4]

Oct/Nov 2009/31

- 2 Solve the equation  $3^{x+2} = 3^x + 3^2$ , giving your answer correct to 3 significant figures. [4]

Oct/Nov 2009/32

- 1 Solve the equation

$$\ln(5 - x) = \ln 5 - \ln x,$$

giving your answers correct to 3 significant figures. [4]

May/June 2010/31

- 3 The variables  $x$  and  $y$  satisfy the equation  $x^n y = C$ , where  $n$  and  $C$  are constants. When  $x = 1.10$ ,  $y = 5.20$ , and when  $x = 3.20$ ,  $y = 1.05$ .

(i) Find the values of  $n$  and  $C$ . [5]

(ii) Explain why the graph of  $\ln y$  against  $\ln x$  is a straight line. [1]

May/June 2010/32

- 1 Solve the equation

$$\frac{2^x + 1}{2^x - 1} = 5,$$

giving your answer correct to 3 significant figures. [4]

- 2 The variables  $x$  and  $y$  satisfy the equation  $y^3 = Ae^{2x}$ , where  $A$  is a constant. The graph of  $\ln y$  against  $x$  is a straight line.
- (i) Find the gradient of this line. [2]
- (ii) Given that the line intersects the axis of  $\ln y$  at the point where  $\ln y = 0.5$ , find the value of  $A$  correct to 2 decimal places. [2]