

1. The variables x and y are believed to satisfy a relationship of the form $y = ab^x$, where a and b are constants. The values obtained in an experiment are shown in the table below.

x	1	2	3	4	5
y	14.1	15.8	17.8	19.9	22.4

By plotting a suitable graph, verify the relationship. Use your graph to calculate approximate values of a and b .

[7]
(june2004)

2. (a) Solve the equation

$$e^{\ln 2x} + \ln e^x = 6 \quad [2]$$

- (b) The table below shows values of two quantities P and Q connected by the equation

$$P = a + be^{-Q}$$

P	-2.485	-2.303	-1.792	-1.386	-0.693
Q	0	1	3	4	5

By means of a suitable graph, find the values of a and b .

[5]
(nov2004)

- 3 The variable quantities x and y are related by the equation $y = ab^x$ where a and b are constants. When a graph is plotted showing values of $\ln y$ on the vertical axis and values of x on the horizontal axis, the points lie on a straight line having gradient 0.8 and y intercept at 3.3.

Find the values of a and b correct to one decimal place.

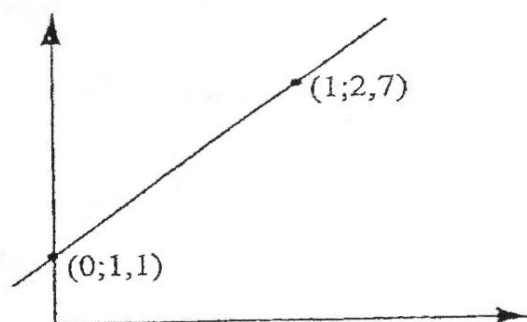
[4]

3. . The variables p and q are known to be connected by the following $pq^M = N$, where M and N are constants. In an experiment, the following values of p and q were obtained.

p	1.5	2	3	4	5
q	5.05	4.22	3.27	2.73	2.38

- (i) Construct a table of values of $\lg p$ and $\lg q$, giving the values to 2 decimal places. [2]
- (ii) Plot the values of $\lg p$ against the values of $\lg q$ using a scale of 2cm to represent 0.1 units on each axis. [2]
- (iii) Hence
- (a) show that the given values are in agreement with the formula $pq^M = N$. [2]
- (b) determine the values of M and N . [4]

1. A mathematician working with an exponential relation $y = ab^x$ reduced it to linear form and came out with the graph shown in the diagram below.



- (i) State the label on each of the axes [2]
- (ii) Calculate the value of a and the value of b . [3]

- 1 If a and b are positive real numbers, $a \neq b$ and $\log_a b + \frac{2}{\log_a b} = 3$, express b in terms of a . [4]

- 6 By putting $10^x = m$, show that the solution to the equation

$$\frac{10^x + 10^{-x}}{10^x - 10^{-x}} = k \text{ is } x = \frac{1}{2} \lg \left(\frac{k+1}{k-1} \right).$$

Hence show that $x = \lg 2 + \frac{1}{2} \lg 3 - \frac{1}{2}$ when $k = 11$. [6]

- 7 The table shows the values of a variable p obtained experimentally from the values of q .

q	2	3	4	5
p	3.55	1.93	1.26	0.90

The variables p and q are related by the relation $\log p = b \log q + \log a$.

By plotting the graph of $\log p$ against $\log q$, determine the approximate values of a and b . [6]