

Section 3: Modelling curves

Section test

1. An experiment is carried out in which the relationship between two variables N and t is believed to be of the form $N = ab^t$, where a and b are constants. A student plots an appropriate graph and finds that this gives a straight line with gradient m and intercept c .

What is the graph which the student plotted?

Find expressions for a and b in terms of m and c .

2. An experiment is carried out in which the relationship between two variables y and x is believed to be of the form $y = kx^n$, where k and n are constants. A student plots an appropriate graph and finds that this gives a straight line with gradient m and intercept c .

What is the graph which the student plots?

Find expressions for n and k in terms of m and c .

3. An experiment is carried out in which the relationship between two variables p and q is believed to be of the form $p = Aq^n$, where A and n are constants. A student plots an appropriate graph plotted and finds that this gives a straight line with gradient -2 and intercept 0.5 .

What is the graph that the student plotted?

Find the values of A (to 1 decimal place) and n (to the nearest whole number).

4. An experiment is carried out in which the relationship between two variables s and t is believed to be of the form $s = ka^t$, where k and a are constants. A student plots an appropriate graph plotted and finds that this gives a straight line with gradient 0.8 and intercept 0.3 .

What is the graph that the student plotted?

Find the values of k and a to 1 decimal place.

5. In an experiment, data is collected for two variables x and y . The graph of $\log y$ is plotted against $\log x$ and is found to be approximately a straight line with gradient 2 and intercept 0.6 .

The relationship between x and y is approximately given by

(a) $y = 4x^2$

(b) $y = 4 \times 2^x$

(c) $y = 0.6x^2$

(d) $y = 0.6 \times 2^x$

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6. In another experiment, data is collected for two variables p and q .
The graph of $\log q$ is plotted against p and is found to be approximately a straight line with gradient 0.3 and intercept -1 .
The relationship between p and q is approximately given by

(a) $q = 10 \times 2^p$

(b) $q = 10p^2$

(c) $q = \frac{2^p}{10}$

(d) $q = \frac{p^2}{10}$