

8 Theresa bought a house on 2 January 1970 for £8000.

The house was valued by a local estate agent on the same date every 10 years up to 2010.

The valuations are shown in the following table.

Year	1970	1980	1990	2000	2010
Valuation price	£8 000	£19 000	£36 000	£82 000	£205 000

The valuation price of the house can be modelled by the equation

$$V = pq^t$$

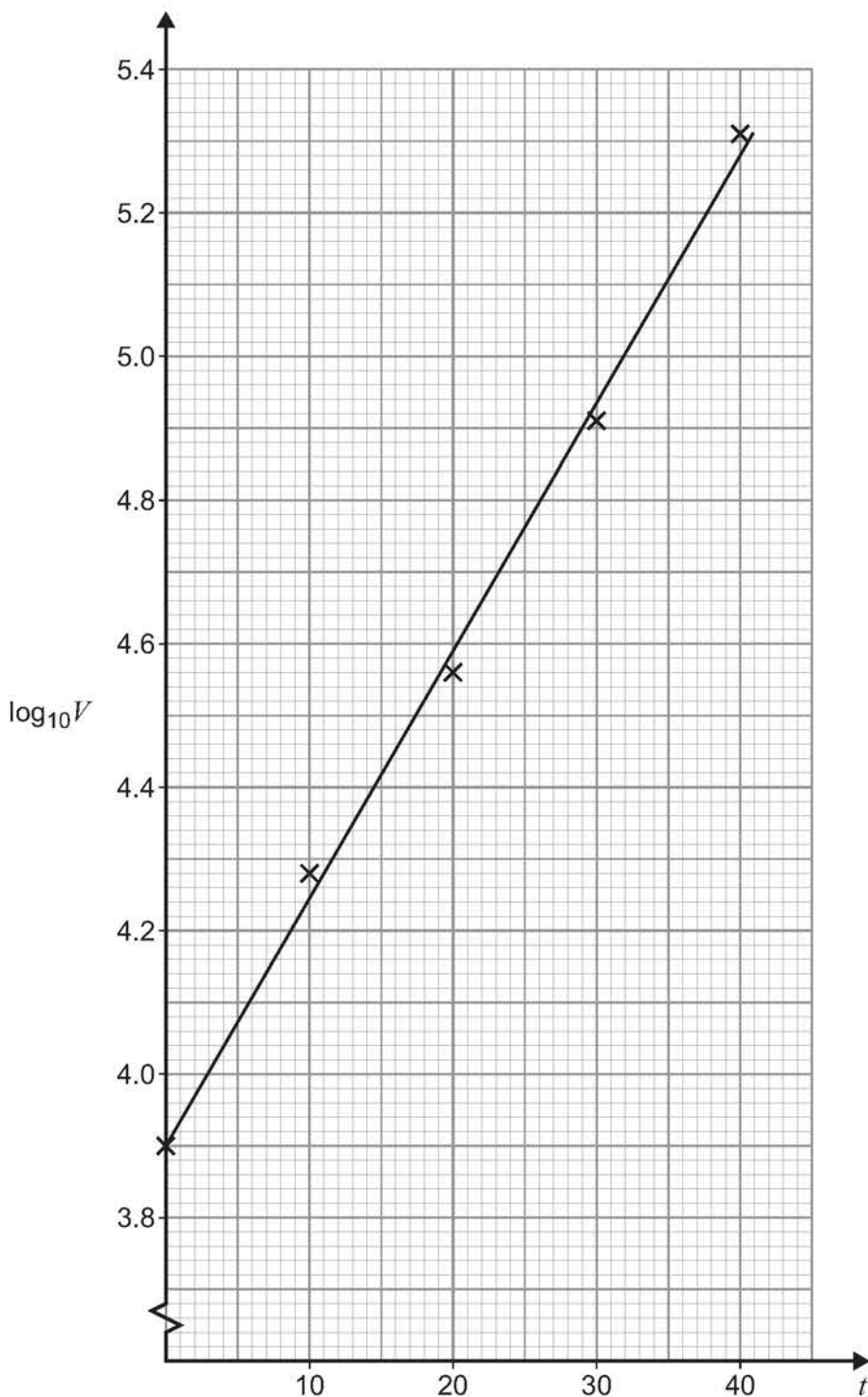
where V pounds is the valuation price t years after 2 January 1970 and p and q are constants.

8 (a) Show that $V = pq^t$ can be written as $\log_{10} V = \log_{10} p + t \log_{10} q$

[2 marks]

8 (b) The values in the table of $\log_{10} V$ against t have been plotted and a line of best fit has been drawn on the graph below.

t	0	10	20	30	40
$\log_{10} V$	3.90	4.28	4.56	4.91	5.31



Using the given line of best fit, find estimates for the values of p and q .

Give your answers correct to three significant figures.

[4 marks]

8 (c) Determine the year in which Theresa's house will first be worth half a million pounds.

[3 marks]

8 (d) Explain whether your answer to part (c) is likely to be reliable.

[2 marks]