

AQA – Exponentials and logarithms – A2 Mathematics P2**1. June/2019/Paper_2/No.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

$$V = pq^t$$

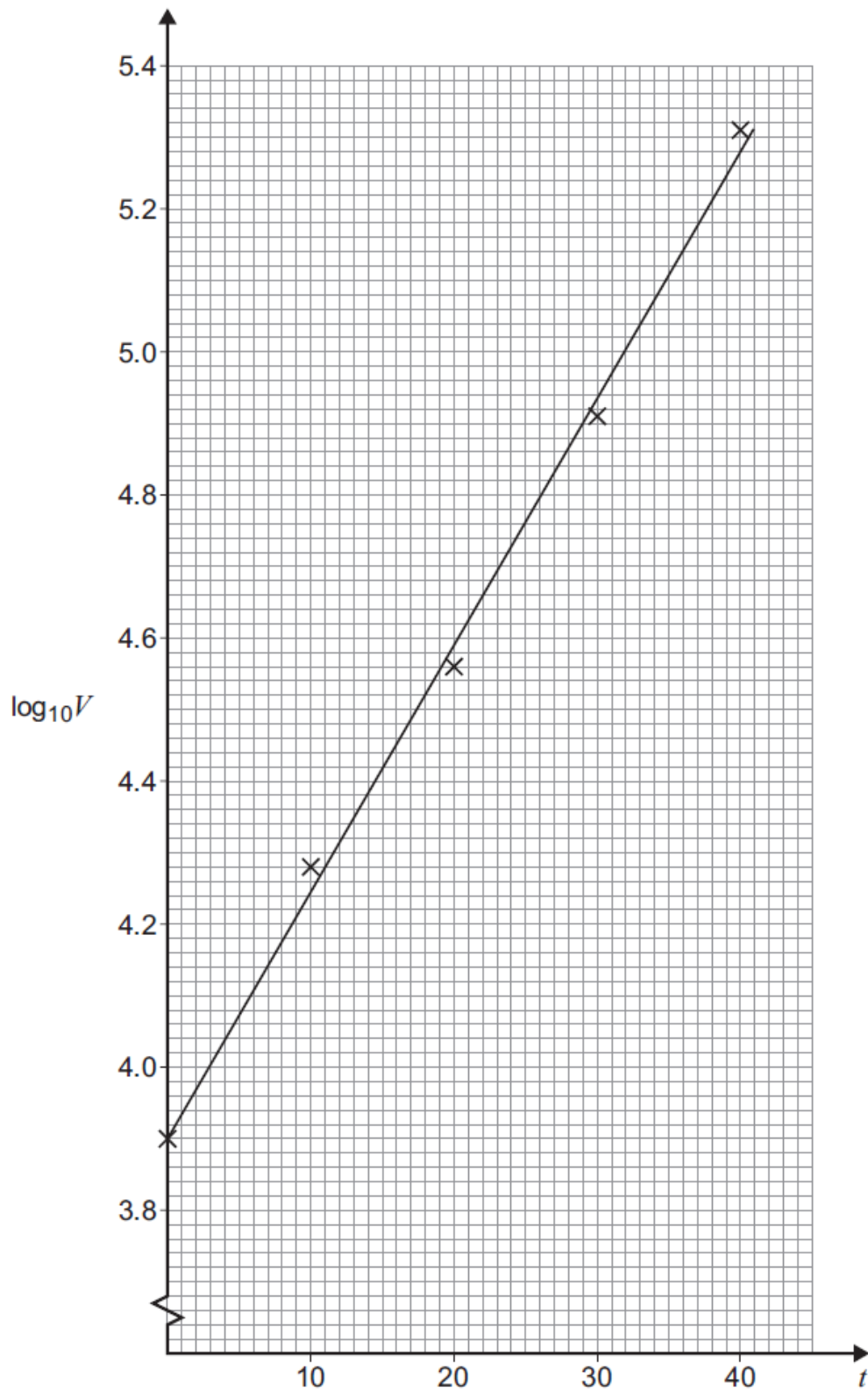
where V pounds is the valuation price t years after 2 January 1970 and p and q are constants.

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

[2 marks]

- (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



(c) Determine the year in which Theresa's house will first be worth half a million pounds. [3 marks]

(d) Explain whether your answer to part (c) is likely to be reliable. [2 marks]
