

SAMPLE PAPER 4: PAPER 1

QUESTION 8 (50 MARKS)

Question 8 (a)

$$y = ab^t$$

$$\log_{10} y = \log_{10}(ab^t)$$

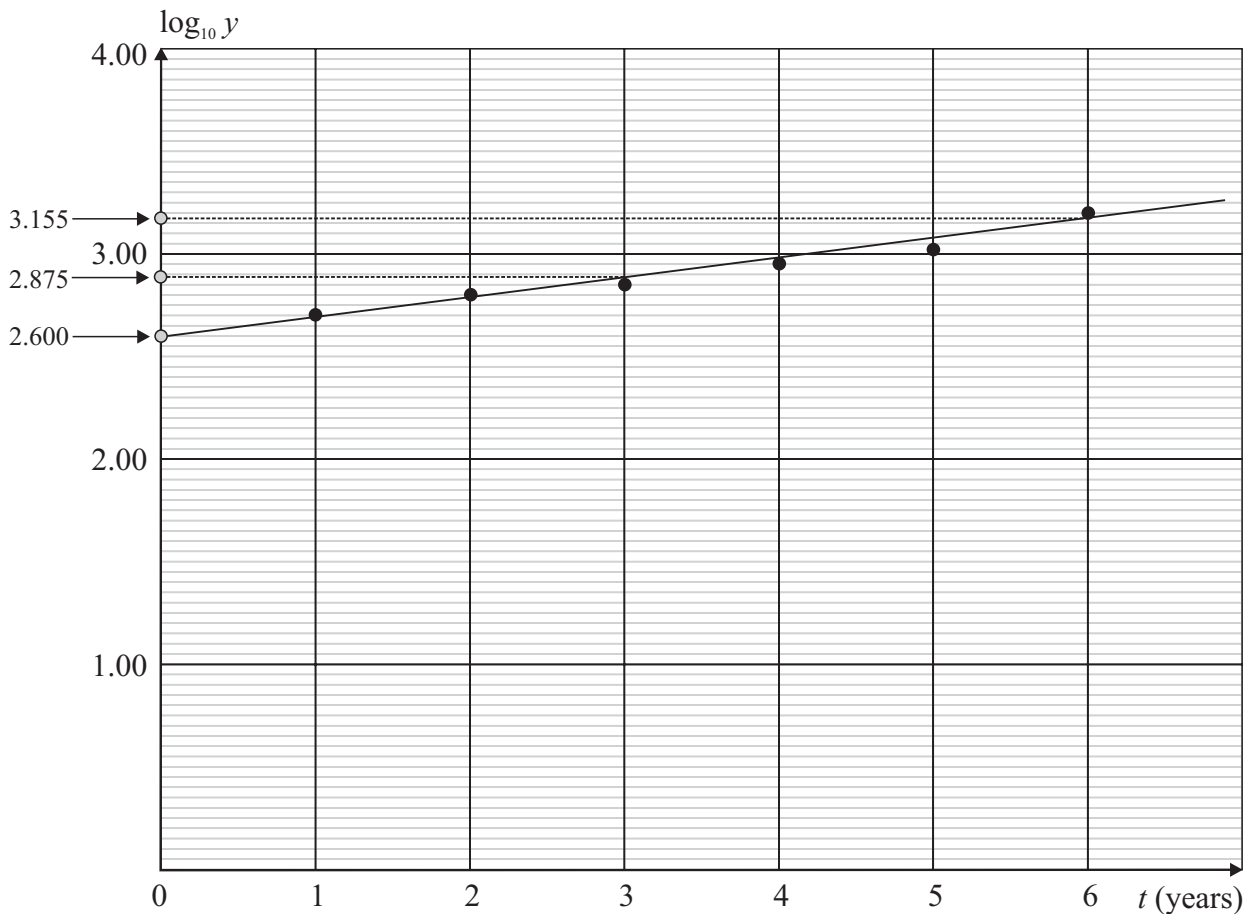
$$\log_{10} y = \log_{10} a + \log_{10} b^t$$

$$\log_{10} y = \log_{10} a + t \log_{10} b$$

Question 8 (b) (i)

t (Number of years after 2006)	1	2	3	4	5	6
y (Cost €)	500	610	720	890	1050	1540
$\log_{10} y$	2.70	2.79	2.86	2.95	3.02	3.19

Question 8 (b) (ii)



Question 8 (c)

$$y = mx + c$$

$$\log_{10} y = t \log_{10} b + \log_{10} a$$

$$c = \log_{10} a$$

$$2.6 = \log_{10} a \Rightarrow a = 10^{2.6} = 398$$

$$m = \log_{10} b$$

Points on graph: (3, 2.875), (6, 3.155)

$$m = \frac{3.155 - 2.875}{6 - 3} = 0.093$$

$$0.093 = \log_{10} b \Rightarrow b = 10^{0.093} = 1.24$$

Question 8 (d)

€398

Question 8 (e)

$$y = ab^t$$

$$2200 = 398 \times 1.24^t$$

$$\frac{2200}{398} = 1.24^t$$

$$\log_{10} \left(\frac{2200}{398} \right) = t \log_{10} 1.24$$

$$\therefore t = \frac{\log_{10} \left(\frac{2200}{398} \right)}{\log_{10} 1.24} = 7.9 \approx 8 \text{ years}$$
