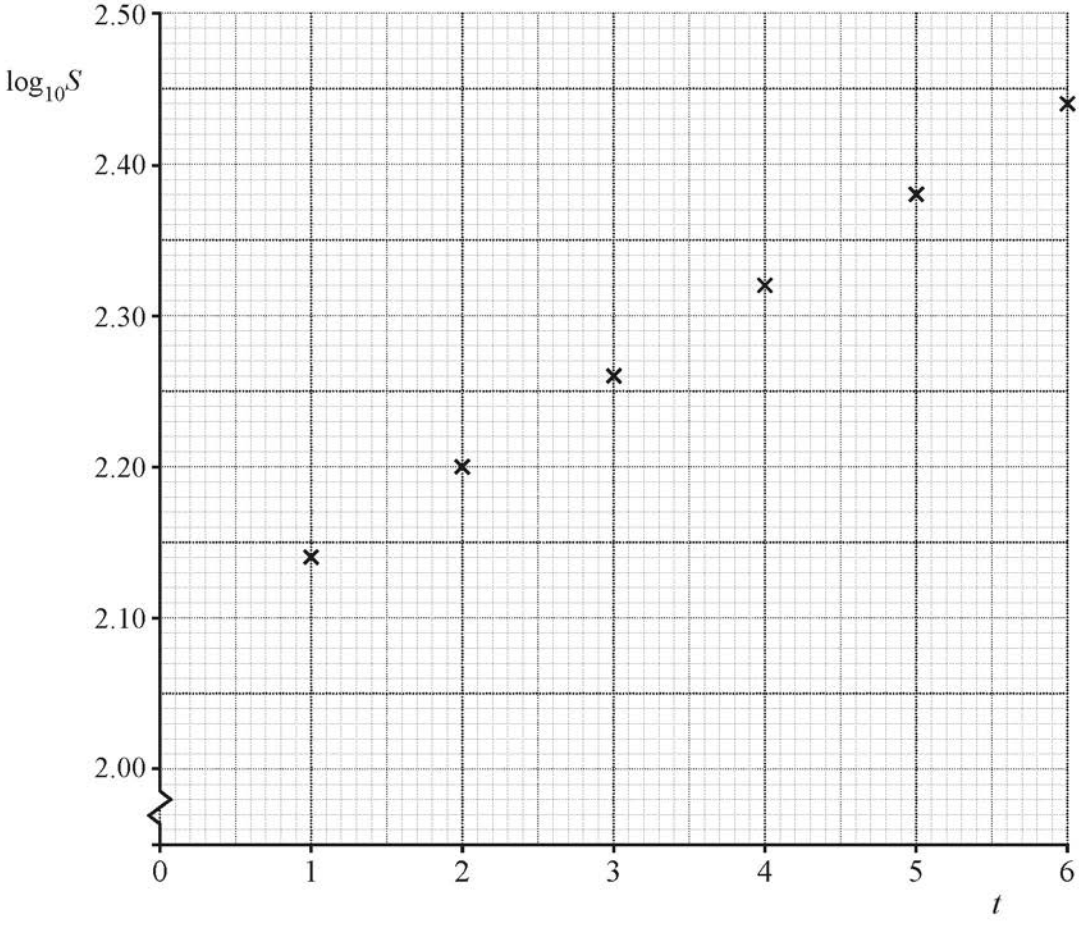
11 The owners of an online shop believe that their sales can be modelled by $S = ab^t$, where a and b are both positive constants, S is the number of items sold in a month and t is the number of complete months since starting their online shop.

The sales for the first six months are recorded, and the values of $\log_{10} S$ are plotted against t in the graph below. The graph is repeated in the Printed Answer Booklet.



(a) Explain why the graph suggests that the given model is appropriate. **[3]**

The owners believe that $a = 120$ and $b = 1.15$ are good estimates for the parameters in the model.

(b) Show that the graph supports these estimates for the parameters. **[2]**

(c) Use the model $S = 120 \times 1.15^t$ to predict the number of items sold in the **seventh** month after opening. **[2]**

(d) **(i)** Use the model $S = 120 \times 1.15^t$ to predict the number of months after opening when the **total** number of items sold after opening will first exceed 70 000. **[4]**

(ii) Comment on how reliable this prediction may be. **[1]**