4.

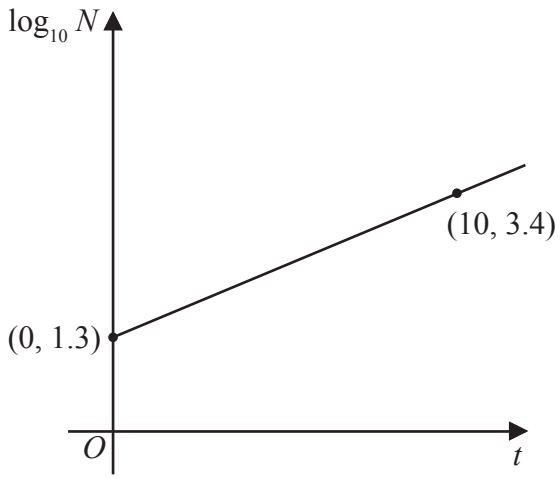

Figure 2

The total number of deliveries made by a company is being monitored.

The total number of deliveries, N thousands, made by the company, t years after monitoring began, is modelled by the equation

$$N = pq^t$$

where p and q are constants.

Figure 2 shows the linear relationship between $\log_{10} N$ and t

(a) Find, to 4 significant figures, the value of p and the value of q.

(4)

When $t = T$, $N = 700$

(b) Find, according to the model, the value of T to 3 significant figures.

(Solutions relying entirely on calculator technology are not acceptable.)

(2)

(Total for Question 4 is 6 marks)

5. **In this question you must show all stages of your working.**
Solutions relying entirely on calculator technology are not acceptable.

The functions f and g are defined by

$$f(x) = \frac{5x + 2}{x - 3} \qquad x \in \mathbb{R} \quad x > 3$$

$$g(x) = 7 + 5e^{x-2} \qquad x \in \mathbb{R}$$

(a) State the range of f

(2)

(b) Find g^{-1}

(3)

(c) Find the exact value of a for which

$$fg(a) = 8$$

Give the answer in simplest form.

(3)

(Total for Question 5 is 8 marks)