8 In an experiment, the temperature of a hot liquid is measured every minute.
The difference between the temperature of the hot liquid and room temperature is D °C at time t minutes.

Fig. 8 shows the experimental data.

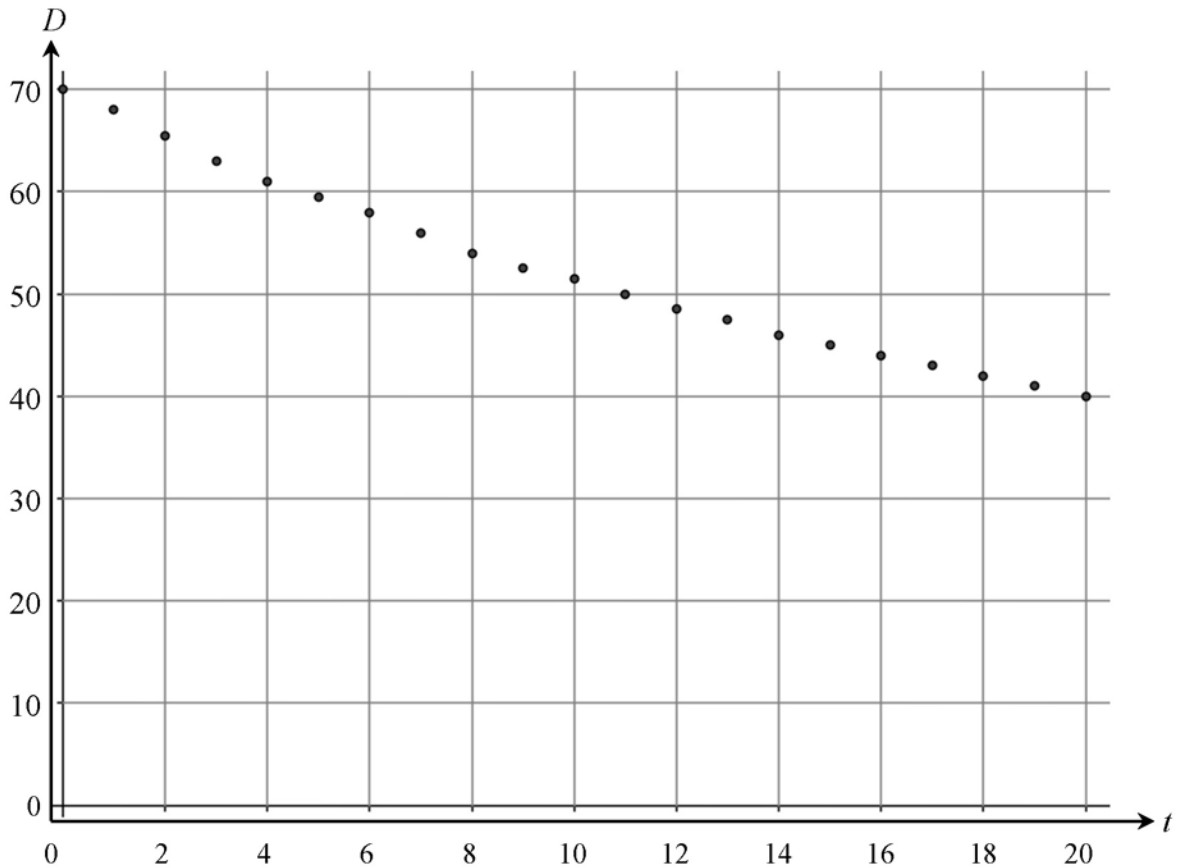

Fig. 8

It is thought that the model $D = 70e^{-0.03t}$ might fit the data.

(a) Write down the derivative of $e^{-0.03t}$. **[1]**

(b) Explain how you know that $70e^{-0.03t}$ is a decreasing function of t. **[1]**

(c) Calculate the value of $70e^{-0.03t}$ when

(i) $t = 0$, **[1]**

(ii) $t = 20$. **[1]**

(d) Using your answers to parts **(b)** and **(c)**, discuss how well the model $D = 70e^{-0.03t}$ fits the data. **[3]**