

**11** A car is travelling along a stretch of road at a steady speed of  $11\text{ms}^{-1}$ .

The driver accelerates, and  $t$  seconds after starting to accelerate the speed of the car,  $V$ , is modelled by the formula

$$V = A + B(1 - e^{-0.17t}).$$

When  $t = 3$ ,  $V = 13.8$ .

**(a)** Find the values of  $A$  and  $B$ , giving your answers correct to 2 significant figures. **[3]**

When  $t = 4$ ,  $V = 14.5$  and when  $t = 5$ ,  $V = 14.9$ .

**(b)** Determine whether the model is a good fit for these data. **[2]**

**(c)** Determine the acceleration of the car according to the model when  $t = 5$ , giving your answer correct to 3 decimal places. **[2]**

The car continues to accelerate until it reaches its maximum speed.

The speed limit on this road is  $60\text{kmh}^{-1}$ . All drivers who exceed this speed limit are recorded by a speed camera and automatically fined £100.

**(d)** Determine whether, according to the model, the driver of this car is fined £100. **[3]**