

9. A quantity of ethanol was heated until it reached boiling point.

The temperature of the ethanol,  $\theta^{\circ}\text{C}$ , at time  $t$  seconds after heating began, is modelled by the equation

$$\theta = A - Be^{-0.07t}$$

where  $A$  and  $B$  are positive constants.

Given that

- the initial temperature of the ethanol was  $18^{\circ}\text{C}$
- after 10 seconds the temperature of the ethanol was  $44^{\circ}\text{C}$

(a) find a complete equation for the model, giving the values of  $A$  and  $B$  to 3 significant figures.

(4)

Ethanol has a boiling point of approximately  $78^{\circ}\text{C}$

(b) Use this information to evaluate the model.

(2)