

**2** Two curves have equations  $y = \ln x$  and  $y = \frac{k}{x}$ , where  $k$  is a positive constant.

**(a)** Sketch the curves on a **single** diagram. **[3]**

**(b)** Explain how your diagram shows that the equation  $x \ln x - k = 0$  has exactly one real root. **[2]**