

9.

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

(a) Sketch the curve C with equation

$$y = \frac{1}{4 - x} \quad x \neq 4$$

On your sketch show

- the equation of the vertical asymptote
- the coordinates of the point of intersection of C with the y -axis

(3)

The straight line l has equation $y = 2x + k$, where k is a constant.

Given that l cuts C at least once,

(b) (i) show that

$$k^2 + 16k + 56 \geq 0 \quad \textbf{(4)}$$

(ii) find the range of values of k , giving your answer in set notation.

(2)