9 A curve C has equation

$$y = \frac{qx - 2}{x - p} \qquad x \neq p$$

The curve crosses the y-axis at the point A.

The line l with equation $y = x + 2$ is the normal to C at A.

(a) (i) Show that $p = 1$

(ii) Find the value of q.

(7)

(b) Using the axes on the opposite page, sketch C, showing clearly the asymptotes and the coordinates of the points where C crosses the coordinate axes.

(5)

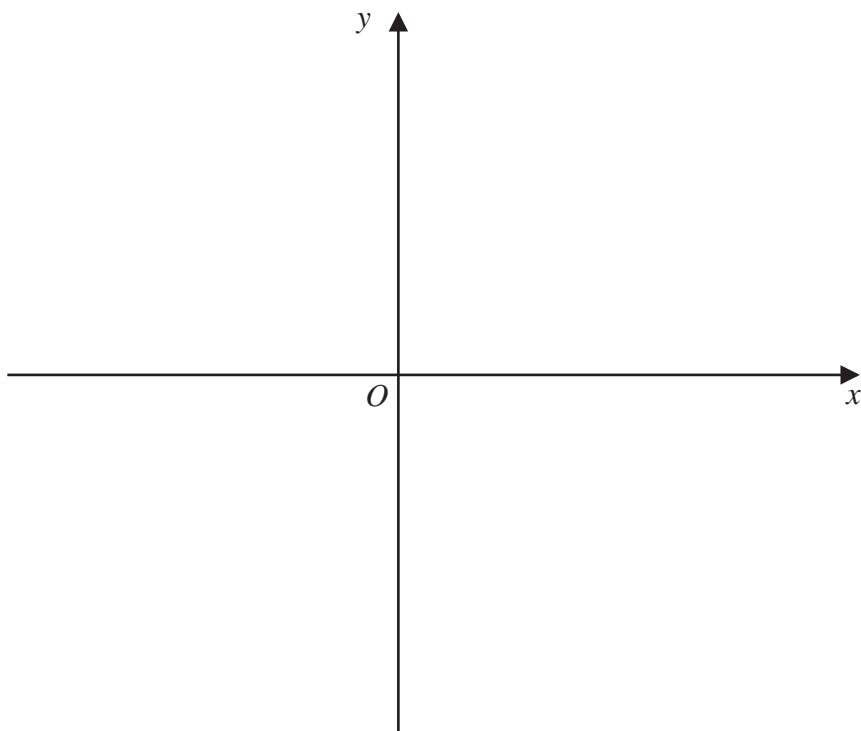The line l meets C again at the point D.

(c) Find the x coordinate of D.

(4)

Question 9 continued

Question 9 continued

Question 9 continued

(Total for Question 9 is 16 marks)