11 A curve C has equation

$$y = \frac{(2a-1)x+1}{ax-6} \qquad \text{where } a \text{ is a constant and } x \neq \frac{6}{a}$$

(a) Find $\frac{dy}{dx}$

(3)

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

The normal to C at the point A is the line l with equation $66y - 72x + 11 = 0$

Show that

(b) (i) $a = 3$

(4)

(ii) the equation of C is $y = \frac{5x+1}{3x-6}$ where $x \neq 2$

(1)

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

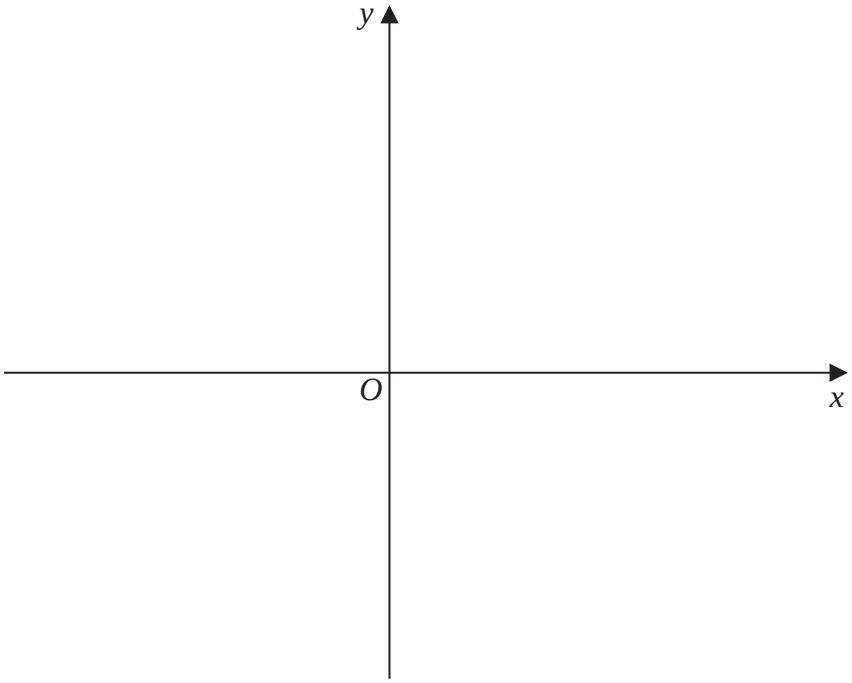
(5)

The line l meets C again at the point D.

(d) Find the x coordinate of D.
Give your answer as an improper fraction.

(4)

Question 11 continued



Question 11 continued

Question 11 continued

Question 11 continued

(Total for Question 11 is 17 marks)

TOTAL FOR PAPER IS 100 MARKS