

11 A curve  $C$  has equation

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

(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)

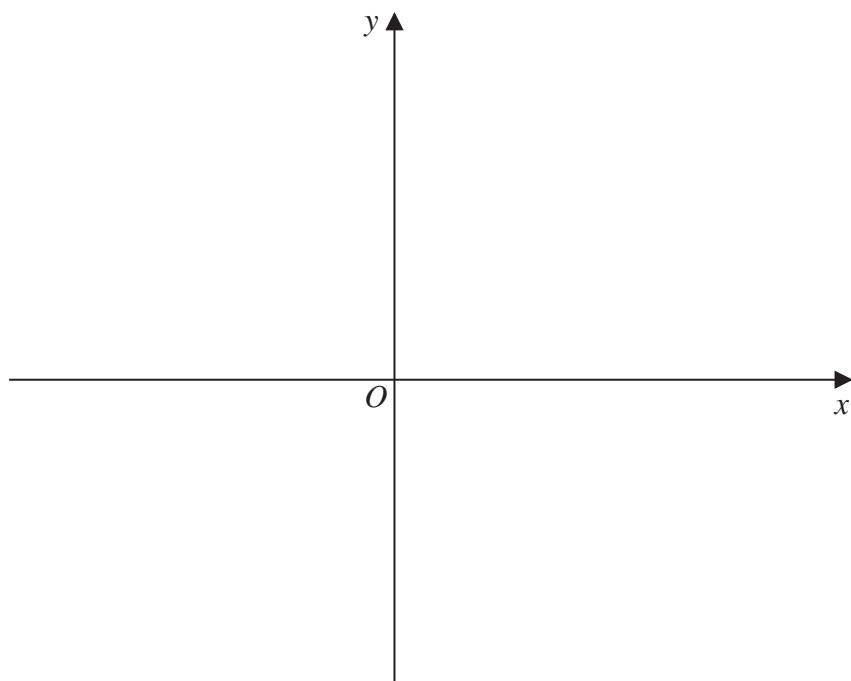
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## Question 11 continued



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**Question 11 continued**

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**Question 11 continued**

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Area for writing answers, consisting of multiple horizontal dotted lines.



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**Question 11 continued**

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**(Total for Question 11 is 17 marks)****TOTAL FOR PAPER IS 100 MARKS**