

AQA  
Further Pure Mathematics 1  
分类真题  
2018-2022 册

A Level Clouds 出品

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# **Chapter 1**

Loci, Graphs and Algebra

- 8 A hyperbola  $H_1$  has equation

$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$$

where  $a$  and  $b$  are positive constants.

$H_1$  intersects the  $x$ -axis at the points  $(6, 0)$  and  $(-6, 0)$

The asymptotes of  $H_1$  have equations

$$y = \frac{2}{3}x \quad \text{and} \quad y = -\frac{2}{3}x$$

- 8 (a) Find the values of  $a$  and  $b$ .

[2 marks]

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$$a = \underline{\hspace{2cm}}$$

$$b = \underline{\hspace{2cm}}$$

**8 (b)** The hyperbola  $H_1$  is translated by the vector  $\begin{bmatrix} 4 \\ 0 \end{bmatrix}$  to give the hyperbola  $H_2$

**8 (b) (i)** Write down the equation of  $H_2$

[1 mark]

Answer \_\_\_\_\_

**8 (b) (ii)** Show that, if the line  $y = mx$  intersects  $H_2$ , then the  $x$ -coordinates of the points of intersection must satisfy the equation

$$(4 - 9m^2)x^2 - 32x - 80 = 0$$

[3 marks]

**8 (b) (iii)** Find the equations of the tangents to  $H_2$  which pass through the origin.

**[5 marks]**

Answer \_\_\_\_\_

**10**

A curve  $C$  has the equation

$$y = \frac{(x+5)(x+1)}{x(x-4)}$$

**10 (a)**

State the equations of the asymptotes of  $C$ .

**[3 marks]**

Answer

**10 (b)** The line  $y = k$  intersects the curve  $C$ .

**10 (b) (i)** Show that

$$4k^2 + 17k + 4 \geq 0$$

**[4 marks]**

**10 (b) (ii)** Hence find the coordinates of the stationary points of the curve  $C$ .

No credit will be given for solutions using differentiation.

**[5 marks]**

Answer

**8** The curve  $C$  has equation

$$y = \frac{x-2}{x-3}$$

**8 (a)** State the equations of the asymptotes of  $C$ .

**[2 marks]**

**8 (b)** The line  $L$  has equation

$$y = \frac{1}{2}x$$

Find the coordinates of the points of intersection of  $L$  and  $C$ .

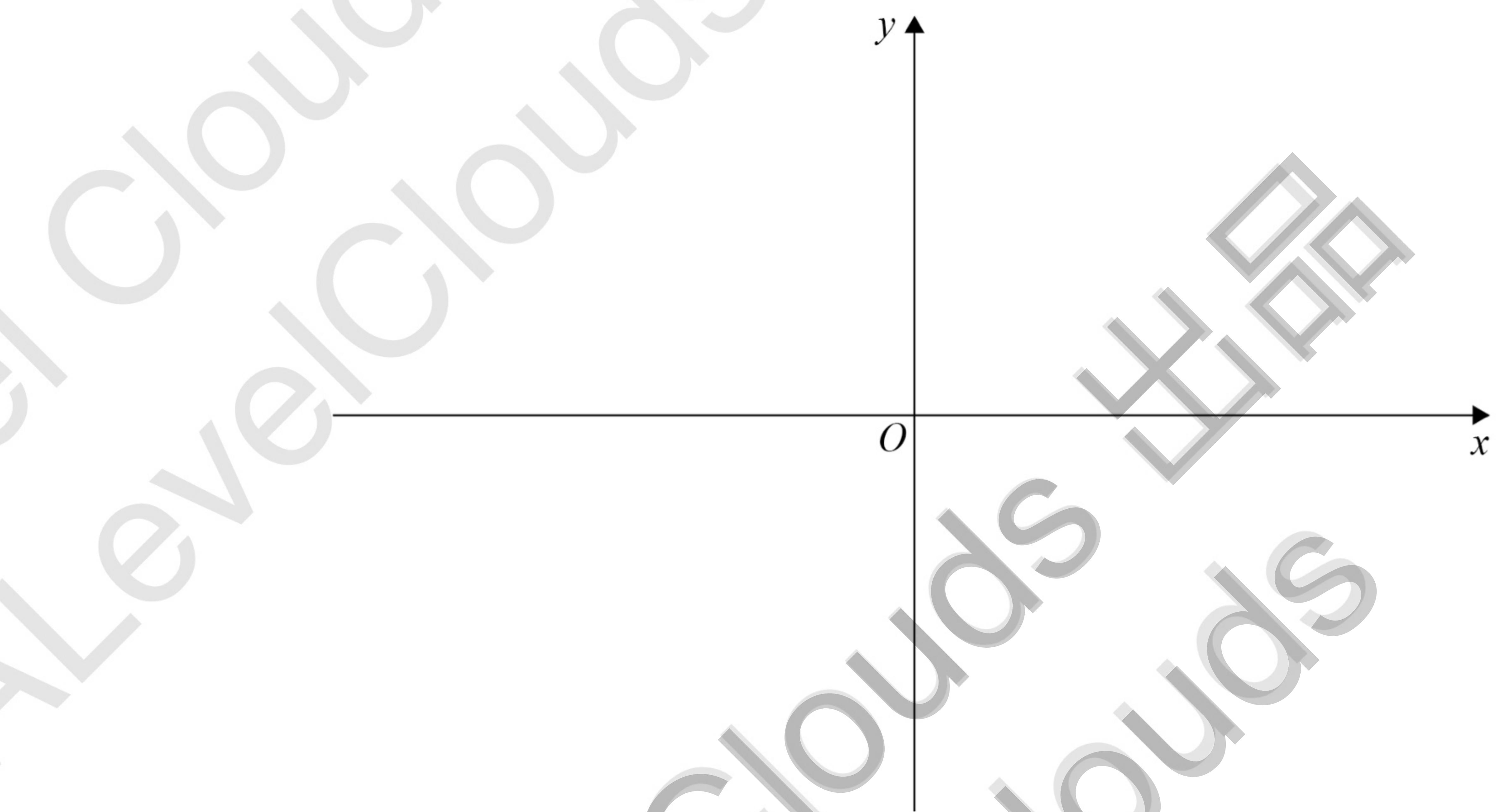
**[4 marks]**

Answer \_\_\_\_\_

8 (c) Sketch  $C$  and  $L$  on the same axes.

You are given that  $C$  has no stationary points.

[4 marks]



8 (d) Solve the inequality

$$\frac{x-2}{x-3} \leq \frac{1}{2}x$$

[2 marks]

Answer \_\_\_\_\_

9 The ellipse  $E_1$  has equation

$$\frac{x^2}{16} + \frac{y^2}{12} = 1$$

The locus of a point  $P$  is such that the distance from  $P$  to the point  $(6, 0)$  is half the distance from  $P$  to the  $y$ -axis.

9 (a) The locus of  $P$  is the curve  $E_2$

Show that  $E_2$  is an ellipse which is a translation of  $E_1$

Write down the vector for this translation.

[7 marks]

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Answer