

8.

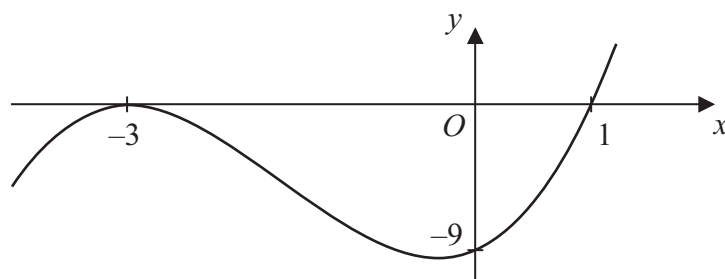


Figure 1

Figure 1 shows a sketch of the curve with equation $y = f(x)$ where

$$f(x) = (x + 3)^2 (x - 1), \quad x \in \mathbb{R}.$$

The curve crosses the x -axis at $(1, 0)$, touches it at $(-3, 0)$ and crosses the y -axis at $(0, -9)$

- (a) In the space below, sketch the curve C with equation $y = f(x + 2)$ and state the coordinates of the points where the curve C meets the x -axis. **(3)**
- (b) Write down an equation of the curve C . **(1)**
- (c) Use your answer to part (b) to find the coordinates of the point where the curve C meets the y -axis. **(2)**



Question 8 continued

Q8

(Total 6 marks)



P 4 1 8 0 2 A 0 1 7 2 8

10. Given the simultaneous equations

$$\begin{aligned} 2x + y &= 1 \\ x^2 - 4ky + 5k &= 0 \end{aligned}$$

where k is a non zero constant,

(a) show that

$$x^2 + 8kx + k = 0 \tag{2}$$

Given that $x^2 + 8kx + k = 0$ has equal roots,

(b) find the value of k . (3)

(c) For this value of k , find the solution of the simultaneous equations. (3)



11.

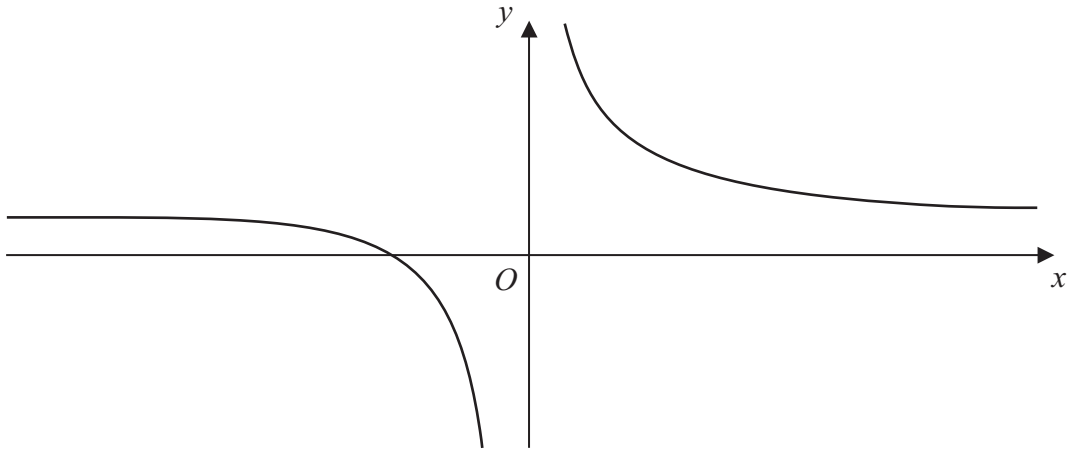


Figure 2

Figure 2 shows a sketch of the curve H with equation $y = \frac{3}{x} + 4$, $x \neq 0$.

(a) Give the coordinates of the point where H crosses the x -axis. (1)

(b) Give the equations of the asymptotes to H . (2)

(c) Find an equation for the normal to H at the point $P(-3, 3)$. (5)

This normal crosses the x -axis at A and the y -axis at B .

(d) Find the length of the line segment AB . Give your answer as a surd. (3)



