



2.

$$g(x) = e^{x-1} + x - 6$$

- (a) Show that the equation $g(x) = 0$ can be written as

$$x = \ln(6 - x) + 1, \quad x < 6$$

(2)

The root of $g(x) = 0$ is α .

The iterative formula

$$x_{n+1} = \ln(6 - x_n) + 1, \quad x_0 = 2$$

is used to find an approximate value for α .

- (b) Calculate the values of x_1 , x_2 and x_3 to 4 decimal places.

(3)

- (c) By choosing a suitable interval, show that $\alpha = 2.307$ correct to 3 decimal places.

(3)



3.

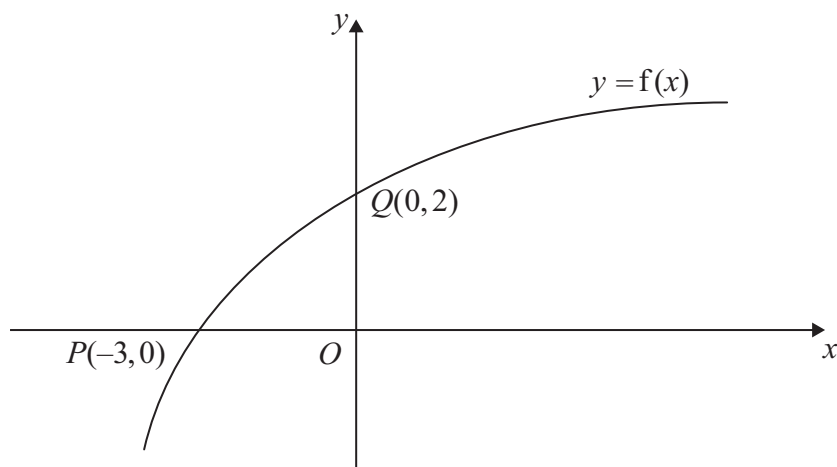


Figure 1

Figure 1 shows part of the curve with equation $y = f(x)$, $x \in \mathbb{R}$.

The curve passes through the points $Q(0,2)$ and $P(-3,0)$ as shown.

- (a) Find the value of $ff(-3)$. **(2)**

On separate diagrams, sketch the curve with equation

- $$(b) \quad y = f^{-1}(x), \tag{2}$$

- $$(c) \quad y = f(|x|) - 2, \tag{2}$$

- $$(d) \quad y = 2f\left(\frac{1}{2}x\right). \quad (3)$$

Indicate clearly on each sketch the coordinates of the points at which the curve crosses or meets the axes.



Question 3 continued



P 4 1 4 8 6 A 0 7 2 8





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Question 6 continued



7.
$$h(x) = \frac{2}{x+2} + \frac{4}{x^2+5} - \frac{18}{(x^2+5)(x+2)}, \quad x \geq 0$$

- (a) Show that $h(x) = \frac{2x}{x^2 + 5}$ (4)

- (b) Hence, or otherwise, find $h'(x)$ in its simplest form. (3)

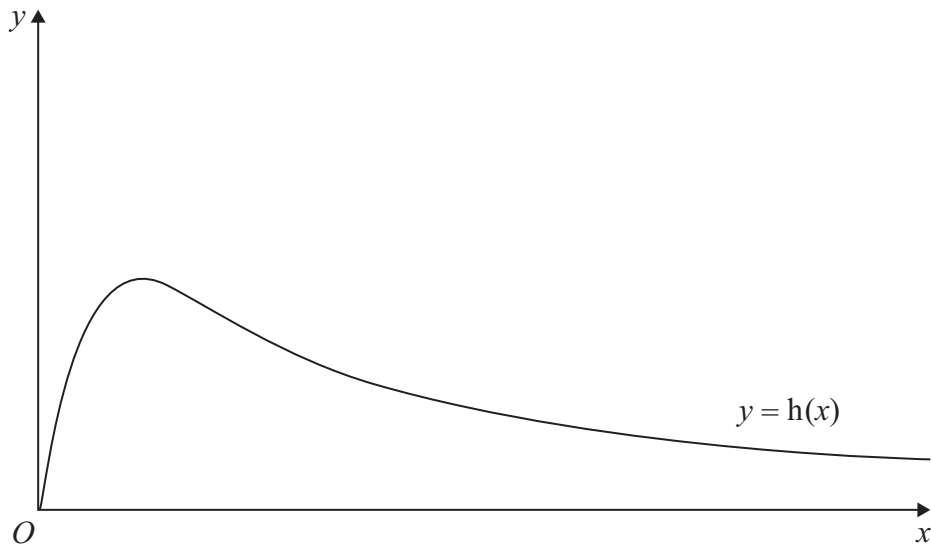


Figure 2

Figure 2 shows a graph of the curve with equation $y = h(x)$.

- (c) Calculate the range of $h(x)$. (5)



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Question 7 continued



- $$V = 17000e^{-0.25t} + 2000e^{-0.5t} + 500$$

(a) Find the value of the car when $t = 0$

(1)

- (4)

- (4)

[illegible]

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Question 8 continued

Q8

(Total 9 marks)

TOTAL FOR PAPER: 75 MARKS

END

