6.

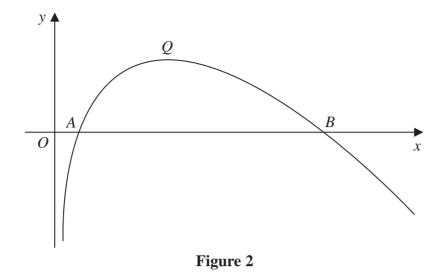


Figure 2 shows a sketch of the curve with equation y = f(x), where

$$f(x) = (8 - x) \ln x, \qquad x > 0$$

The curve cuts the x-axis at the points A and B and has a maximum turning point at Q, as shown in Figure 2.

(a) Find the x coordinate of A and the x coordinate of B.

(c) Show that the x coordinate of Q lies between 3.5 and 3.6

(b) Show that the x coordinate of Q satisfies

$$x = \frac{8}{1 + \ln x}$$

(d) Use the iterative formula 
$$x_{n+1} = \frac{8}{1 + \ln x_n} \qquad n \in \mathbb{N}$$

with  $x_1 = 3.5 \text{ to}$ 

- (i) find the value of  $x_5$  to 4 decimal places,
- (ii) find the x coordinate of Q accurate to 2 decimal places.

(1)