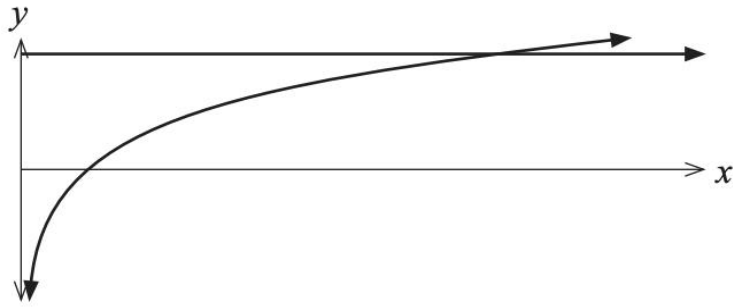


**Question 7****(10 marks)**

- (a) Determine a simplified expression for  $\frac{d}{dx}(x \ln(x))$ . (2 marks)

- (b) Use your answer from part (a) to show that  $\int \ln(x) dx = x \ln(x) - x + c$ , where  $c$  is a constant. (4 marks)

The graphs of the functions  $f(x) = 5$  and  $g(x) = \ln(x)$  are shown below.



- (c) Determine the exact area enclosed between the  $x$  axis, the  $y$  axis and the functions  $f(x)$  and  $g(x)$ . (4 marks)