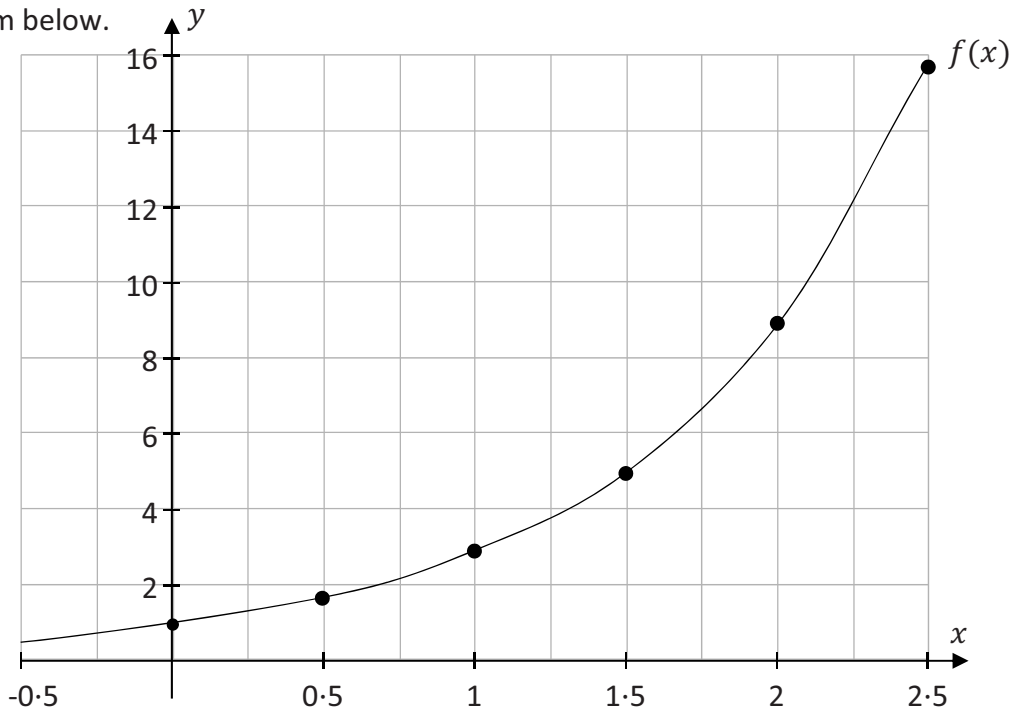


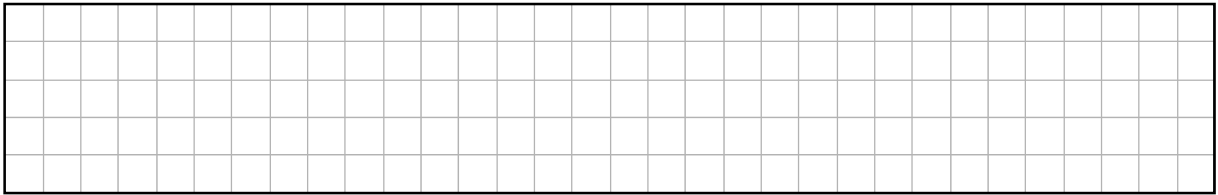
**Question 2**

**(25 marks)**

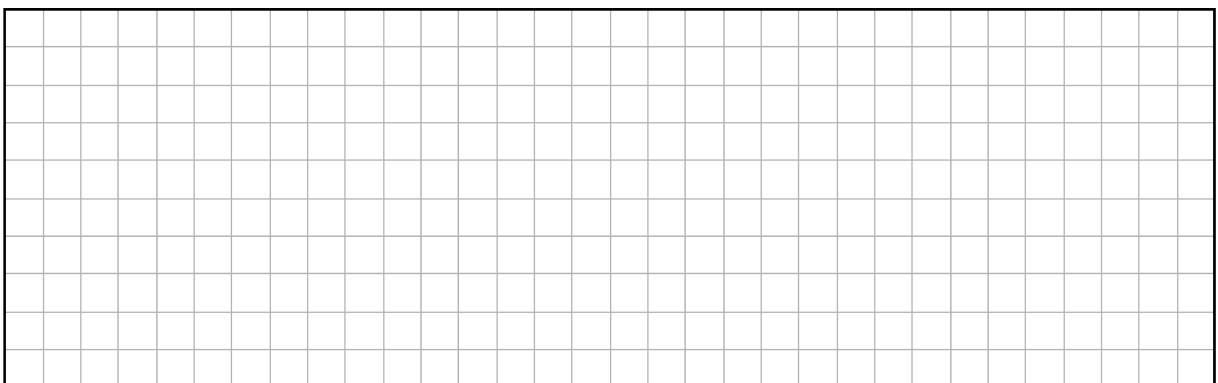
The graph of the function  $f(x) = 3^x$ , where  $x \in \mathbb{R}$ , cuts the  $y$ -axis at  $(0, 1)$  as shown in the diagram below.



- (a) (i) Draw the graph of the function  $g(x) = 4x + 1$  on the diagram.



- (ii) Use substitution to verify that  $f(x) < g(x)$ , for  $x = 1.9$ .



(b) Prove, using induction, that  $f(n) \geq g(n)$ , where  $n \geq 2$  and  $n \in \mathbb{N}$ .

