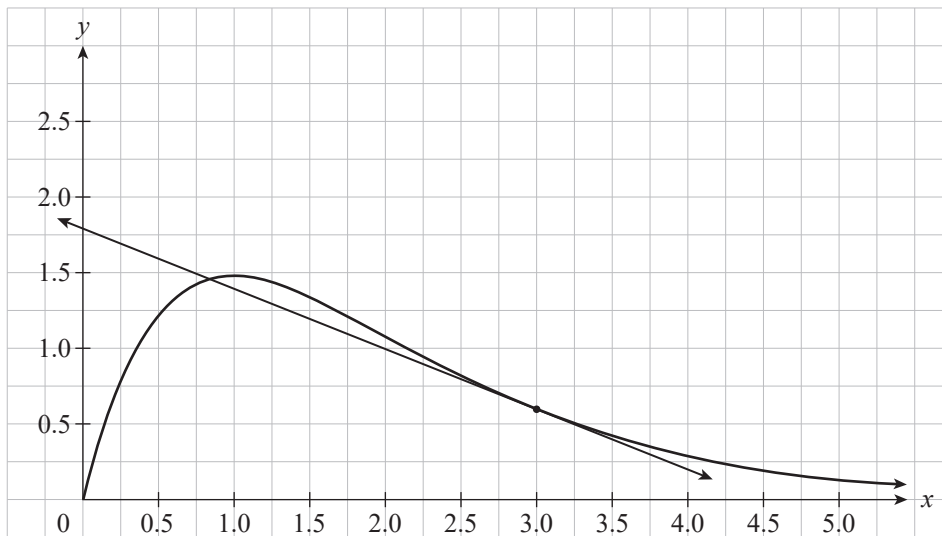




The graph of  $y = f(x)$  is shown below, along with the tangent to this graph at the point where  $x = 3$ .



(b) On the graph above, draw a tangent that has a greater  $y$ -intercept than that of the tangent shown. (1 mark)

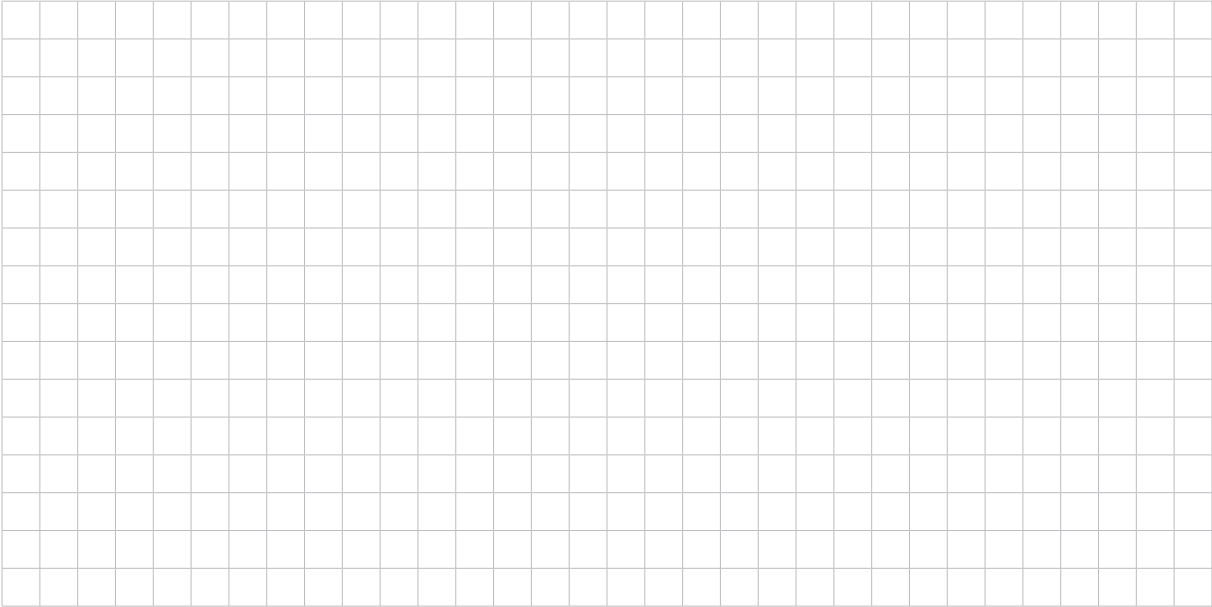
(c) Show that the tangent to the graph of  $y = f(x)$  at the point where  $x = a$  has the equation

$$y = 4(1 - a)e^{-a}x + 4a^2e^{-a}.$$



(5 marks)

(d) Using the equation given in part (c), determine the value of  $a$  that maximises the  $y$ -intercept of the tangent to the graph of  $y = f(x)$  at the point where  $x = a$ .



(3 marks)