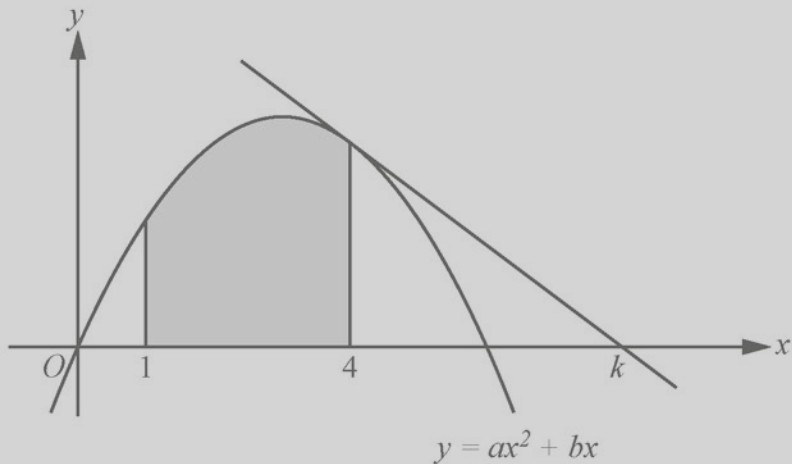


8 (a) The quadratic polynomial $ax^2 + bx$, where a and b are constants, is denoted by $f(x)$.

Use differentiation from first principles to determine, in terms of a , b and x , an expression for $f'(x)$. [4]

(b)



The diagram shows the quadratic curve $y = ax^2 + bx$, where a and b are constants. The shaded region is enclosed by the curve, the x -axis and the lines $x = 1$ and $x = 4$.

The tangent to the curve at $x = 4$ intersects the x -axis at the point with coordinates $(k, 0)$.

Given that the area of the shaded region is 9 units², and the gradient of this tangent is $-\frac{3}{4}$, determine the value of k . [7]