1999 CALCULUS BC

6. Let f be the function whose graph goes through the point $(3, 6)$ and whose derivative is given by $f'(x) = \dfrac{1 + e^x}{x^2}$.

    (a) Write an equation of the line tangent to the graph of f at $x = 3$ and use it to approximate $f(3.1)$.

    (b) Use Euler's method, starting at $x = 3$ with a step size of 0.05, to approximate $f(3.1)$. Use f'' to explain why this approximation is less than $f(3.1)$.

    (c) Use $\displaystyle\int_3^{3.1} f'(x)\,dx$ to evaluate $f(3.1)$.

END OF EXAMINATION