1) Use the limit definition and directly find the derivative of the function

\[ f(x) = \frac{1}{x + 2} \]  \hspace{1cm} (1)

Hint: Use \( f'(x) = \lim_{h \to 0} \frac{f(x+h)-f(x)}{h} \) and then simplify it in a way to get rid of the indefinite case.

2) If \( f(x) = 2x + e^{3x} + \tan(x) \) and \( g(x) \) is the inverse of \( f \), then find \( g'(1) \)

Hint: Differentiate both side of this equation with respect to \( t \) and consider \( x \) and \( y \) independent functions of \( t \).
3) A function is moving on the graph of the function \( f(x) = x^2 \). First, find the distance of an arbitrary point on this graph from the origin. What is the rate of change of distance when \( \frac{dx}{dt} = 2 \) feet/s at \( x = 2 \)?

Hint: The distance of an arbitrary point like \((x, y)\) from the origin is given by \( s = \sqrt{x^2 + y^2} \). Here, a point on the graph of this function is given by \((x, x^2)\). Use this fact and find an equation for distance as a function of \( x \). For part b what you only need to do is just to differentiate the distance with respect to time.