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

$$f(x) = \frac{1}{x+2} \tag{1}$$

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  $\frac{dx}{dt} = 2\frac{feet}{s}$  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.