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

$$
\begin{equation*}
f(x)=\frac{1}{x+2} \tag{1}
\end{equation*}
$$

Hint: Use $f^{\prime}(x)=\lim _{h \rightarrow 0} \frac{f(x+h)-f(x)}{h}$ and then simplify it in a way to get rid of the indefinite case.
2) If $f(x)=2 x+e^{3 x}+\tan (x)$ and $g(x)$ is the inverse of f , then find $g^{\prime}(1)$

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 $\frac{d x}{d t}=2 \frac{f e e t}{s}$ 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 $\left(x, x^{2}\right)$. 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.

