Homework4

October 11, 2024

1. $f(x) = \left(x^3 + 3x\right)^2 (2x + 1)$, find $f'(x)$

2. $f(x) = \sqrt{\frac{x+1}{x^2+1}}$, find $f'(1)$

3. Given $y = (f(x) + 3x)^2$ and $x = t^3 - 2t$, where $f(4) = 6$ and $\left.\frac{dy}{dt}\right|_{t=2} = 180$, find the value of $f'(4)$.

4. For the equation $x^2 + 3x^2y + y^3 = 1$, find $\left.\frac{d^2y}{dx^2}\right|_{(0,1)}$.

5. Suppose $f(x) = x^3 - 3x^2 + 2$,
   (1) Find the relative extremum of the function $f(x)$
   (2) Find the absolute extremum of the function $f(x)$ in the interval [0, 4].