

Homework 5

1. Prove that $f(x) = 3x^2 + 5x$ is differentiable at $x = 2$.
2. Prove that $f(x) = \sqrt[3]{x}$ is differentiable at $x = 8$.
3. Prove that $f : (0, \infty) \rightarrow \mathbb{R}$, $f(x) = 1/x^2$ is differentiable everywhere.
4. Find a and b such that

$$f(x) = \begin{cases} ax + 3 & \text{if } x < 3 \\ x^2 + 2x + b & \text{if } x \geq 3 \end{cases}$$

is differentiable everywhere.

5. Find the points where $f : \mathbb{R} \rightarrow \mathbb{R}$, $f(x) = x^{2/5}$ is differentiable.