Homework 4

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 $f : (0, \infty) \to \mathbb{R}$, $f(x) = 1/x^2$ 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.