

Assignment 1

Proofs and Calculus

August 17, 2018

Problem 1. Write a paragraph or more on your understanding of each methods of proofs namely contradiction, contraposition and induction.

Problem 2. Prove that $\sqrt{6}$ is irrational.

Problem 3. If a and b are integers with $b > 0$, then there exist unique integers q and r such that $a = qb + r$ and $0 \leq r < b$. Prove that q and r are unique.

Problem 4. Find the derivative of $\log x$ using definition of derivative. (The limit definition).

Problem 5. Use the mean value theorem to prove that $\log(x + 2) < x \ \forall \ x > 0$

Problem 6. Approximate $\log(1 + x^2 + 2x)$ using Taylor expansion.