CSC236H Exercise 1

Due by the end of Tutorial 2

Fall 2017

IMPORTANT:

- This exercise is worth 1% of your total mark in the course.
- You must work on this exercise in groups of two, and submit a single solution. Submissions completed individually will NOT be marked.
- You and your group-mate must have been assigned to the same tutorial room. Also, you must submit your solution to the TA who is teaching your tutorial section.
- Submit your solutions to your TA by the end of tutorial. Late submissions will NOT be accepted.
- Start working on the exercises *before* the tutorial. During the tutorial you may ask the TAs for hints if you are stuck. You may also ask them to comment on your answers, which you may then change accordingly.

1. Use induction to prove that $3^{2n} - 1$ is divisible by 8, for all $n \in \mathbb{N}$.
2. Assume $x \in \mathbb{R}$ and $(x + \frac{1}{x}) \in \mathbb{Z}$. Use induction to prove that for all $n \in \mathbb{N}$

$$(x^n + \frac{1}{x^n}) \in \mathbb{Z}.$$