Introduction to Abstract Mathematics — Assignment 3.2
Spring 2017 — Due February 3

Exercise 1. Prove that if m and n are consecutive integers, then exactly one of them is even and the other is odd.

Exercise 2.(Arithmetic Mean-Geometric Mean Inequality) Prove that if a and b are distinct nonnegative real numbers, then

$$\sqrt{ab} < \frac{a+b}{2},$$

i.e. that the geometric (multiplicative) mean is always less than the arithmetic (additive) mean.

Exercise 3. Suppose that x and y are real numbers. Prove that if $x^2y = 2x + y$, then $y \neq 0$ implies $x \neq 0$.

Exercise 4. Suppose that x and y are real numbers, that $x + y = 2y - x$, and that x and y aren't both zero. Prove that $y \neq 0$.