Homework 3

1. Prove that the difference of two odd integers is even. Give a justification at each step. (20 points)

2. Prove that the sum of any two rational numbers is a rational number. Give a justification at each step. (20 points)

3. Prove by contradiction that there is no greatest integer. (20 points)

4. Prove by contraposition that for all integers n, if n^2 is even then n is even. (20 points)

5. Prove using mathematical induction: $\forall$ integers $n \geq 1$, $2 + 4 + ... + 2n = n^2 + n$. Give justifications for each step. (20 points)

Grading Rubric:

Question	Meets	Does not Meet
Question 1	**20 points** Innovative and correct method of solution. Calculations and supporting evidence are complete and correct for the problem. Solution is neat, well-organized and well-written.	**0 points** Solution not described, or not correct. Calculations and supporting evidence are incorrect or not present. Solution is unorganized and poorly written.
Question 2	**20 points** Innovative and correct method of solution.	**0 points** Solution not described, or not correct.

	Calculations and supporting evidence are complete and correct for the problem. Solution is neat, well-organized and well-written.	Calculations and supporting evidence are incorrect or not present. Solution is unorganized and poorly written.
Question 3	**20 points** Innovative and correct method of solution. Calculations and supporting evidence are complete and correct for the problem. Solution is neat, well-organized and well-written.	**0 points** Solution not described, or not correct. Calculations and supporting evidence are incorrect or not present. Solution is unorganized and poorly written.
Question 4	**20 points** Innovative and correct method of solution. Calculations and supporting evidence are complete and correct for the problem. Solution is neat, well-organized and well-written.	**0 points** Solution not described, or not correct. Calculations and supporting evidence are incorrect or not present. Solution is unorganized and poorly written.
Question 5	**20 points** Innovative and correct method of solution. Calculations and supporting evidence are complete and correct for the problem. Solution is neat, well-organized and well-written.	**0 points** Solution not described, or not correct. Calculations and supporting evidence are incorrect or not present. Solution is unorganized and poorly written.