Let’s form a group of three or four students. Calculate the sum of your student IDs, (say N), and get the remainder of N/4, (say Q = N%4). Choose and solve one of the following four questions corresponding to your Q value. Each group should write their solution on a one-page scratch paper as listing all its group members’ names, turn in the solution to the professor, and choose its group representative who will present the solution to all the class audience in case if the group is asked to do so.

**Group 0: Direct Proof**
- a) Prove that the sum of two odd integers is even.
- b) Prove that the product of two odd numbers is odd.

**Group 1: Proof by Contradiction**
- a) Show that at least 10 of any 64 days chosen must fall on the same day of the week.
- b) Prove that if n is a positive integer, then n is even if and only if 7n + 4 is even.

**Group 2: Deductive Reasoning**
Formulate the following arguments symbolically and determine whether each is valid. Let


- a) If I study hard, then I get A’s.
   
   I study hard.
   
   ∴ I get A’s.

- b) If I study hard, then I get A’s.
   
   If I don’t get rich, then I don’t get A’s.
   
   ∴ I get rich.

- c) I study hard if and only if I get rich.
   
   I get rich.
   
   ∴ I study hard.

- d) If I study hard, then I get A’s.
   
   If I study hard, then I get rich.
   
   ∴ If I study hard, then I get A’s and rich.

- e) If I study hard or I get rich, then I get A’s.
   
   I get A’s.
   
   ∴ If I don’t study hard, then I get rich.

- f) If I study hard, then I get A’s.
   
   I don’t get A’s.
I don’t study hard.

**Group 3: Inference**

a) Use resolution to show the hypotheses “Allen is a bad boy or Hillary is a good girl” and “Allen is a good boy or David is happy” imply the conclusion “Hillary is a good girl or David is happy.”

b) Use resolution to show that the hypotheses “It is not raining or Yvette has her umbrella,” “Yvette does not have her umbrella or she does not get wet,” and “It is raining or Yvette does not get wet” imply that “Yvette does not get wet.”
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**Group Members:** (Circle the group representative name)