

TUTORIAL 1

- (1) Let A be the statement " $1/2 < x < 5/2$," let B be the statement " $x \in \mathbb{Z}$," let C be the statement " $x^2 = 1$," and let D be the statement " $x = 2$." Which of the following statements are true for all $x \in \mathbb{R}$.
- (a) $A \implies C$.
 - (b) $B \implies C$.
 - (c) $(A \wedge B) \implies C$.
 - (d) $(A \wedge B) \implies (C \vee D)$.
 - (e) $C \implies (A \wedge B)$.
 - (f) $D \implies (A \wedge B \wedge (\neg C))$.
 - (g) $(A \vee C) \implies B$.
- (2) Let $x_1, x_2, \dots, x_{2k+1}$ be a collection of odd integers. Prove that $\sum_{i=1}^{2k+1} x_i$ and $\prod_{i=1}^{2k+1} x_i$ are odd.
- (3) Find and prove a formula for $\prod_{i=2}^n (1 - \frac{1}{i^2})$

Just for fun.

- (1) If n lines are drawn in a plane, and no two lines are parallel, how many regions do they separate the plane into?