

Due February 24

Name

Directions: Be sure to include in-line citations, including page numbers if appropriate, every time you use the results of discussion, a text, notes, or technology. **Only write on one side of each page.**

"I never know how much of what I say is true." — Bette Midler

"Logic is the art of going wrong with confidence." (Morris Kline)

Problems

1. (Not a formal proof) Prove that in a finite projective plane of order n , every point is incident with exactly $n + 1$ lines. You may use the fact that every line is incident with exactly $n + 1$ points.
2. (Not a formal proof) Prove that a finite projective plane of order n has exactly $n^2 + n + 1$ lines. You may use both facts stated in the first problem as well as the fact that there are exactly $n + 1$ points.

Do any one of the following

1. Using only material up to, but not including, Proposition 3.3, formally prove, if $A*B*C$ and $A*C*D$, then A, B, C, D are distinct, collinear points.
2. (Not a formal proof) Both the standard Euclidean interpretation and the disk interpretation are **models** of Incidence and Betweenness geometry. Choose one of the four betweenness axioms and show it is independent of the other six axioms by giving an interpretation of the undefined terms for which your chosen Betweenness axiom fails but the Incidence axioms and the other three Betweenness axioms all hold.