Math 487 - Foundations of Geometry
Day 13 Group Assignment **Name:**_____

Definitions:

- Two distinct angle are said to be **supplementary angles** if the sum of their measures is 180.
- Two angles $\angle ABC$ and $\angle CBD$ are a **linear pair** if B is between A and D.
- Two angles $\angle ABC$ and $\angle DBE$ are **vertical angles** if either $A-B-E$ and $C-B-D$ or $A-B-D$ and $C-B-E$.

1. Draw a diagram that represents a linear pair in the Euclidean Plane.

2. Draw diagrams illustrating the two possible betweenness cases for pairs of vertical angles.

Postulate 14:(The Supplement Postulate) If two angles form a linear pair, then they are supplementary.

Theorem 2.8:(The Vertical Angle Theorem) Vertical angles are congruent.

3. Prove Theorem 2.8

Theorem 2.9:(The Crossbar Theorem) If P is an interior point of $\angle ABC$, then the ray $\overrightarrow{BP}$ and the segment $\overline{AC}$ intersect in a unique point F and $A - F - C$.

4. Draw a diagram that illustrates the crossbar theorem in the Euclidean Plane.

5. Write a reasonable and accurate definition for the perpendicular bisector of a segment $\overline{AB}$.

6. Does every segment $\overline{AB}$ have a perpendicular bisector? If one exists, must it be unique? Justify your answers.

Note: If you have time left, you can spend it discussing and putting the finishing touches on Homework Assignment # 3.