Math 4300 - Homework # 11

More on Angles

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1. Let $(\mathscr{P}, \mathscr{L}, d, m)$ be a protractor geometry. Let A, B, C, D be points where A, B, C are non-collinear and C, B, D are non-collinear. Suppose that A and D lie on opposite sides of $\overleftrightarrow{BC}$ and $m(\angle ABC) + m(\angle CBD) = 180$. Prove that the angles $\angle ABC$ and $\angle CBD$ for a linear pair, that is, show that $A - B - D$.

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2. (Unique angle bisector theorem) Let $(\mathscr{P}, \mathscr{L}, d, m)$ be a protractor geometry. Let A, B, C be points where A, B, C are non-collinear. Prove that there exists a unique ray $\overrightarrow{BD}$ with $D \in \text{int}(\angle ABC)$ and $m(\angle ABD) = m(\angle DBC)$.
