Math 331 Worksheet 8

Note: None of these problems are for a grade, though you may obtain extra credit for writing up proofs on the board.

1) Joe Biden has suggested the following alternate proof of the triangle inequality to me. Either find the flaw in Joe's reasoning or justify every step: Consider a triangle $\triangle ABC$. We want to show that $\overline{AC} < \overline{AB} + \overline{BC}$.

- There is a unique perpendicular line to AC that contains the point B. Call this line l and let P be the point of intersection of l with AC.

- $\sphericalangle BPC > \sphericalangle ABP$.

- Therefore, $\sphericalangle BPA > \sphericalangle ABP$.

- Then $AB > AP$.

- So $\overline{AB} > \overline{AP}$.

- Similarly, $\overline{BC} > \overline{CP}$.

- Now $\overline{AC} = \overline{AP} + \overline{PC} < \overline{AB} + \overline{BC}$.

2) Look at the proof of Proposition 4.12. Assume you are now permitted to talk about angle and segment measures, which were defined in the section two prior to that containing Proposition 4.12. Give simpler proofs of both a) and b) using angle and segment measures.