Math 331 Worksheet 5

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

1) Prove the following propositions from the book. You may use any and all betweenness, congruence, and incidence axioms, plus their consequences deduced in the book.

   a) (Proposition 3.6) Given $A * B * C$. Then B is the only point common to rays $\overrightarrow{BA}$ and $\overrightarrow{BC}$, and $\overrightarrow{AB} = \overrightarrow{AC}$.

   b) (Proposition 3.8) If D is in the interior of $\sphericalangle CAB$, then i) so is every other point on ray $\overrightarrow{AD}$ except A; ii) no point on the opposite ray to $\overrightarrow{AD}$ is in the interior of $\sphericalangle CAB$. *Hint*: use Pasch's Theorem on both parts.

   c) (Proposition 3.15) i) Vertical angles are congruent to each other. ii) An angle congruent to a right angle is a right angle. See p.19 for the appropriate definitions. *Hint:* Proposition 3.14.

   d) (Proposition 3.17- ASA) Given $\triangle ABC$ and $\triangle DEF$ with $\sphericalangle A \cong \sphericalangle D$, $\sphericalangle C \cong \sphericalangle F$, and $AC \cong DF$. Then $\triangle ABC \cong \triangle DEF$. *Hint:* there is an outline on page 151.

2) If you are still going, look over the proof of the Crossbar Theorem on page 116 and make sure everyone in your group understands it.