Test 2

Show your work! Answers that do not have a justification will receive no credit.

1. (10 points) Write the negations of the following statements:
   (a) All right angles are congruent.
   (b) For every line $\ell$ there and point $P$ not on $\ell$ there is at most one line $m$ through $P$ and parallel to $\ell$.
   (c) In any triangle the largest side is opposite the largest angle.
   (d) $P$ if and only if $Q$.

2. (10 points) Draw pictures of the following:
   (a) Three rays $\overrightarrow{ABA}$, $\overrightarrow{AC}$ and $\overrightarrow{AD}$ so that $\overrightarrow{AD}$ is between $\overrightarrow{ABA}$ and $\overrightarrow{AC}$
   (b) Four points distinct points $A$, $B$, $C$, and $D$ so that $A \ast B \ast D$ and $A \ast D \ast C$. 
3. (20 points) Prove Pasch’s Theorem: If $A$, $B$ and $C$ are distinct noncollinear points and $\ell$ is a line intersecting $\overline{AB}$ at a point between $A$ and $B$, then $\ell$ also intersects either $\overline{AC}$ or $\overline{BC}$. 
4. (20 points) Let $\ell$ be a line and $P$ a point not on $\ell$. Show that there is a line $m$ through $P$ and perpendicular to $\ell$. 
5. (20 points) Let \( \triangle ABC \) have \( \angle A \cong \angle B \). Then show \( AB \cong BC \).
6. (20 points) Prove SEGMENT SUBTRACTION: If $A \ast B \ast C$, $D \ast E \ast F$, $\overline{AB} \cong \overline{DE}$, and $\overline{AC} \cong \overline{DF}$, then $\overline{BC} \cong \overline{EF}$. 