MAT515 Homework 6
Due Wednesday, October 14

1. Prove the converse of the Pythagorean Theorem: In $\triangle ABC$, let $|AB| = c$, $|AC| = b$ and $|BC| = a$. Then if $a^2 + b^2 = c^2$, show that $\angle C = 90°$.

2. In $\triangle ABC$, let $\angle B = \angle C$. Prove, using similarity, that $|AB| = |AC|$.
Note that we have proven this as Theorem (G26) using congurences. But it is nice to see alternative approaches, so try this way too.

3. Suppose that in $\triangle ABC$, we have $|AB| > |AC|$. Let D be a point on $\overline{BC}$ for which $\overleftrightarrow{AD} \perp \overleftrightarrow{BC}$. Prove that $|BD| > |DC|$.

4. Prove that every equiangular triangle is equilateral, and vice versa.

5. Prove that

   (a) A parallogram is a rectangle if and only if its diagonals are of equal length.

   (b) If a diagonal of a rectangle bisects the angle at a vertex, then the rectangle is a square.