Math 302 Homework 3, Due: 10/29

1. Inside a square $ABDE$, take a point $C$ so that $CDE$ is an isosceles triangle with angles $15^\circ$ at $D$ and $E$. What kind of triangle is $ABC$?

2. Prove that any triangle having two equal medians is isosceles.

3. Prove that the sum of the medians of a triangle lies between $\frac{3}{4}p$ and $p$, where $p$ is the sum of the sides, i.e. the perimeter.

4. Prove that if $P$ is a point on the circumcircle of a triangle, then the feet of perpendiculars from $P$ to the three sides are collinear.

5. Prove the converse of Problem 4, i.e. if the feet of perpendiculars from $P$ to the three sides are collinear, then $P$ must be on the circumcircle of the triangle.