This portion of the test is take-home and ***you are on your honor to work alone*** – you may not get help from other people, in person or via technology. By turning in the assignment with your name, you are verifying that you have worked alone on these problems. You may use books and notes for these problems. ***Show all your work and clearly justify each step in the proof.*** Partial credit may be given for written work. [Point values listed for each problem are approximate.] Good Luck!

Prove each of the following.

1. (12 pts) Prove: If M is any point in the interior of $\triangle PQR$, then $PQ + QR + RP < 2(MP + MQ + MR)$.

2. (12 pts) Given $\triangle ABC$, let D be a point such that $A * B * D$. Prove that the angle bisector of the exterior angle at B and the angle bisector of the interior angle at B are perpendicular.