Math ASP-110 Homework 3 Due 8/13/2018

Using the geometry theorems we used in class:

1. Show that for that any triangle ABC that

$$a = b \cdot \cos C + c \cdot \cos B$$

2. Use the result of 1. to deduced the sine addition formula:

$$\sin(B+C) = \sin B \cdot \cos C + \sin C \cdot \cos B$$

3. Show that in any triangle ABC that the area of the triangle is $\dfrac{abc}{2R}$ where R is the radius of the circumscribing circle.

4. If X, Y and Z are the midpoints of the sides of a triangle prove the cevians to these points meet at a point.

5. Prove that the altitudes of a triangle meet at a point.

6. In the diagram below, the sides of the inner triangle are parallel to those of the outer triangle. Prove that the lines AA', BB' and CC' meet at a point.