HOMEWORK 7 - MATH 325

DUE DATE: Tuesday, April 22
INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 5 points. It is necessary to show your work.

GOOD LUCK!!

1. If A, C, E are three points on one line, B, D, F on another, and if the two lines AB and CD are parallel to DE and FA, respectively, then EF is parallel to BC.

2. Let C and F be any points on the respective sides AE and BD of a parallelogram $AEBD$. Let M and N denote the points of intersection of CD and FA and of EF and BC. Let the line MN meet DA at P and EB at Q. Then $AP = QB$.

3. If two triangles are perspective from a point, and two pairs of corresponding sides are parallel, the two remaining sides are parallel.

4. If a hexagon $ABCDEF$ has two opposite sides BC and EF parallel to the diagonal AD, and two opposite sides CD and FA parallel to the diagonal BE, while the remaining sides DE and AB also are parallel, then the third diagonal CF is parallel to AB, and the centroids of ACE and BDF coincide.

5. (a) If five of the six vertices of a hexagon lie on a circle, and the three pairs of opposite sides meet at three collinear points, then the sixth vertex lies on the same circle.

   (b) For a cyclic quadrangle $ABCE$ with no parallel sides, the tangents at A and C meet on the line joining $AB \cdot CE$ and $BC \cdot EA$.

6. In Figure 3.9D, page 79, the line PQ joining the other two points of contact also passes through the intersection of the diagonals.