Math 460: Homework # 2. Due Thursday August 29

For this assignment you may use anything in the course notes up to Theorem 22.

1. Prove Theorem 2(c) (Note, Theorem 2(c) is stated in the text, but is left out of the list of theorems).

2. (See Figure 1) Given: $ABCD$ is a parallelogram, and the lines that look straight are straight. To prove: E is the midpoint of FG.

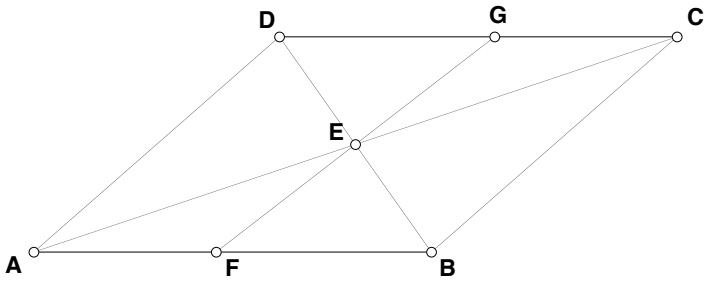

Figure 1

3. (See Figure 2) Given: CD is parallel to AB, $AD = BC$, and AD is **not** parallel to BC. To prove: $AE = BE$.

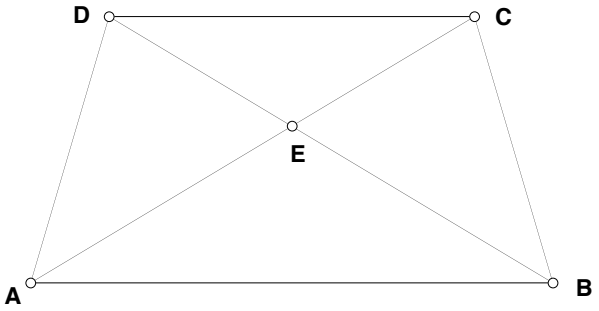

Figure 2

4. Let $ABCD$ be a quadrilateral, and let M, N, P, and Q be the midpoints of the sides. Prove that $MNPQ$ is a parallelogram.

5. Given: $ABCD$ is a parallelogram, l is the line through A which is perpendicular to DC, and E is the intersection of l with DC. Prove that the area of the parallelogram is $AB \cdot AE$.

6. Give a proof of Theorem 8.

7. (See Figure 3) Given: $MK = MQ$, $\angle K = \angle Q$, $PM \perp MK$ and $LM \perp MQ$. To prove: $\angle L = \angle P$.

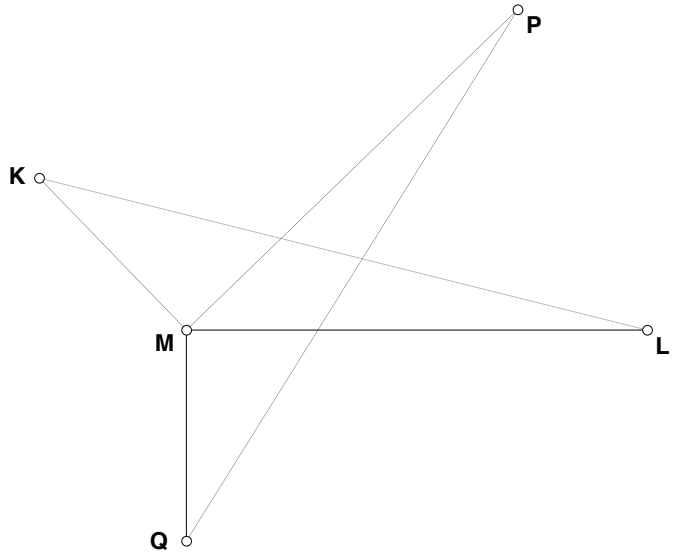

Figure 3

8. (See Figure 4) Given: D is the midpoint of AC and E is the midpoint of BC. To prove: $\dfrac{AF}{FE} = 2$. (Hint: Use similar triangles.)

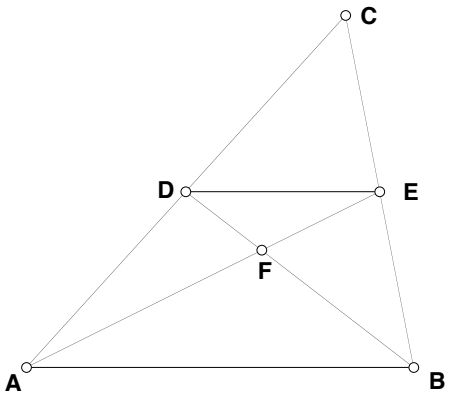

Figure 4

9. (See Figure 5) Given: $\angle 1 = \angle 2$. To prove: $\dfrac{AD}{AC} = \dfrac{BD}{BC}$

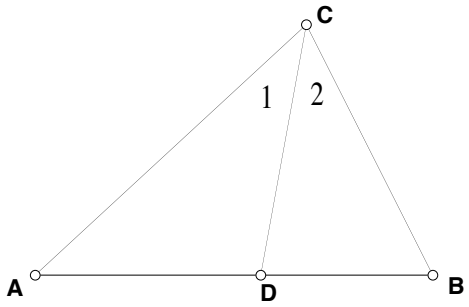

Figure 5

10. (See Figure 6) Given that AB is perpendicular to AC, that AD is perpendicular to BC, and that $AB = BE$, prove that $\angle 1 = \angle 2$.

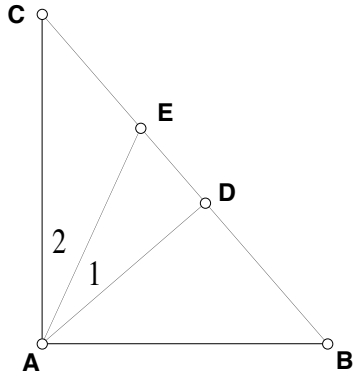

Figure 6

11. (See Figure 7) Given: AB is parallel to CD. To prove: $\triangle ACD$ has the same area as $\triangle BCD$.

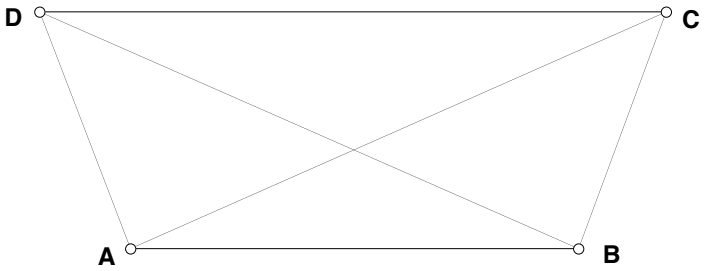

Figure 7