MATH 3370-001 Exam I June 10, 2002

Answer all of the problems on separate paper. Leave adequate space on your answer sheets between problems for responsive comments from me. You do <u>not</u> need to rewrite the problem statements on your answer sheets. Do your own work. Work carefully. **Show** all relevant steps which lead to your solutions. Retain this question sheet for your records.

Terms & Definitions

For each of the following terms give a written definition and sketch an example:

1. Ray
2. Parallel Lines
3. Obtuse angle
4. Polygon
5. Pentagon
6. Scalene Triangle
7. Vertical Angles
8. Prism
9. Cone
10. Perpendicular Bisect of a Segment

Problems

1. Find the exact angle between the hour hand and the minute hand at 4:40.

2. How many distinct planes are determined by the vertices of a:

   a. square pyramid?
   b. square prism?

3. How many faces, edges and vertices does a:

   a. heptagonal pyramid have?
   b. heptagonal prism have?

4. Figure A is a regular hexagon and figure B is a regular pentagon. Figures A and B are exactly the same height. Figure C is a hybrid it is the left half (L) of figure A joined to the right half (R) of figure B. In figure C, what are the measures of the interior angles at the vertices S and at T?

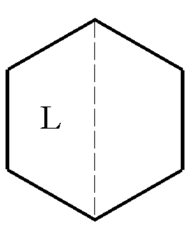


Figure A

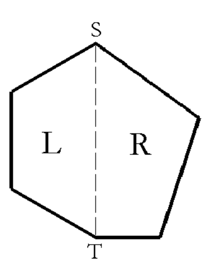


Figure C

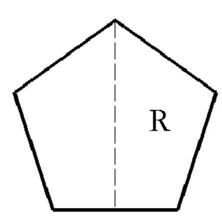
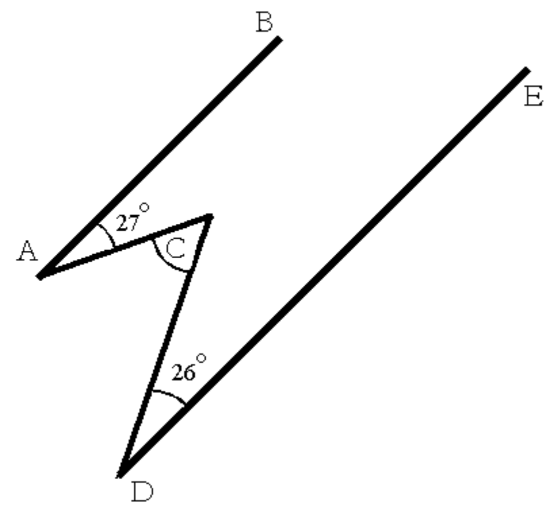


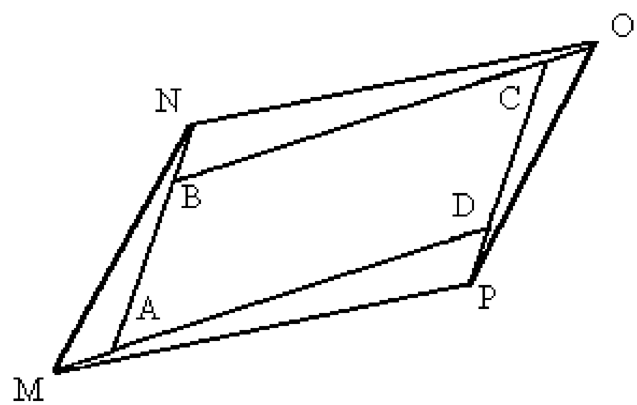
Figure B

5. Find the measure of the angle C in the figure to the right, given that the line segments $\overline{AB}$ and $\overline{DE}$ are parallel.



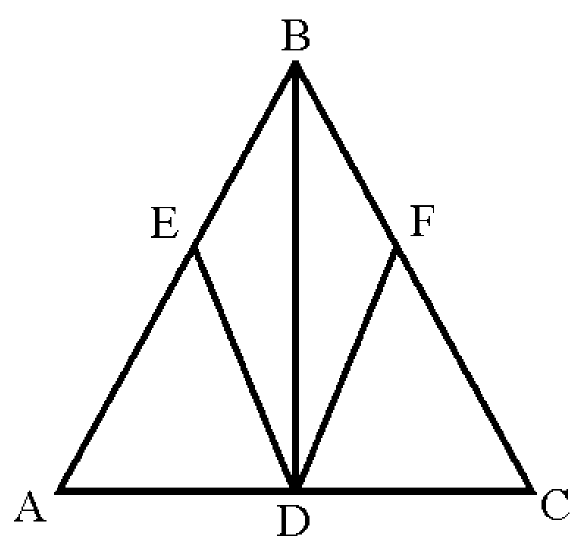
6. In the figure to the right, the sides of the parallelogram *ABCD* are extended at each corner by a fixed distance *d* to form the quadrilateral *MNOP*. Prove that *MNOP* is also a parallelogram.

Suggestion: Use triangle congruences to show that the opposites sides of *MNOP* are congruent.



7. In the figure to the right, $\overline{BD}$ is perpendicular bisector of $\overline{AC}$ and $\overline{BD}$ is the angle bisector of $\angle EDF$. Prove that $\overline{ED} \cong \overline{FD}$.

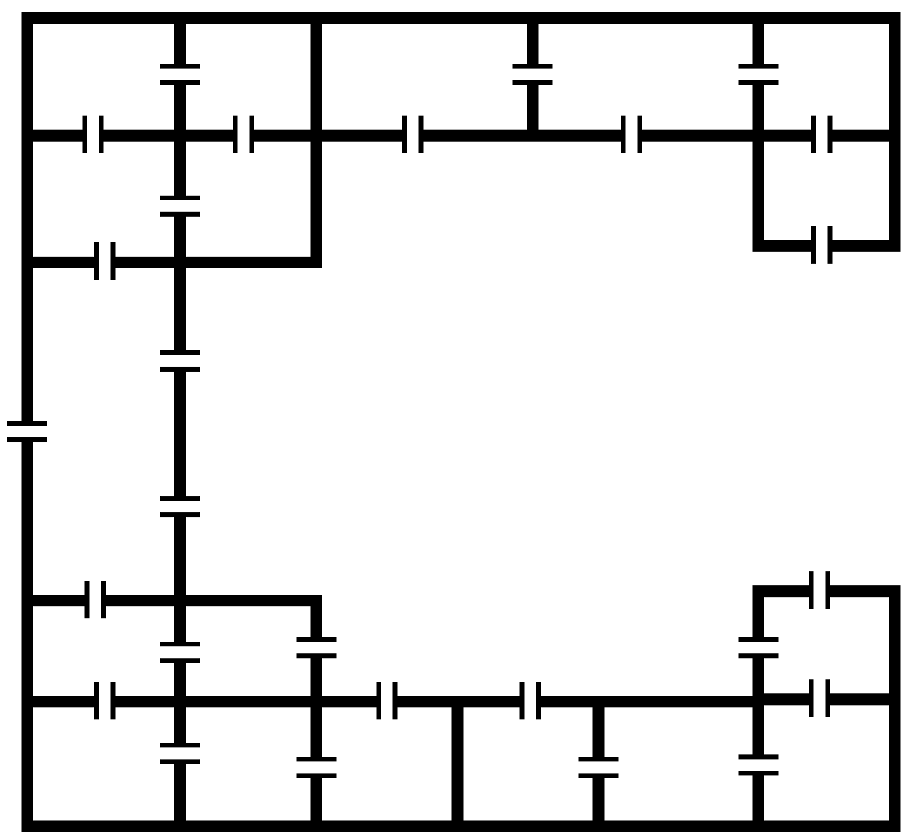
Suggestion: Start off by showing that $\Delta ADB \cong \Delta CDB$



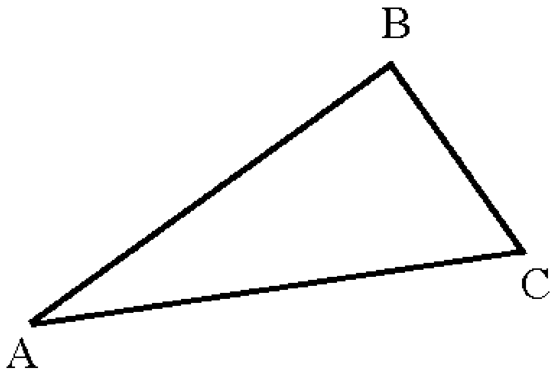
Work Problems 8 - 10 on this page and return this page with your other answer sheets. Clearly show the construction marks required in Problems 9-10 to construct the solutions.

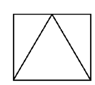
8. Refer to the following courtyard floor plan. Can a person walk through each door way once and only once?

If so, draw a network (superimposed on the floor plan) and indicate a starting point and an ending point. If not, either close one or more doors (but not more than 7) or add one or more doors (but not more than 7) until a traversable network can be created and then draw the network (superimposed on floor plan) and indicate a starting point and an ending point. In the this second case, clearly indicate which doors are closed or added.



9. Given ΔABC below, construct a triangle $\Delta A'B'C'$ such that $\overline{A'B'} \cong \overline{AB}$, $\overline{A'C'} \cong \overline{AC}$ and $m(\angle A') = 2\, m(\angle A)$.



10. Construct an equilateral triangle whose base is three times the length of the segment $\overline{AB}$ given below. Then, construct a rectangle on the base of the equilateral triangle whose height is the height of the equilateral triangle (so the figure looks like ).