

Figure 1:

**MATH 300**

**Spring 2005**

**Homework 11**

**Due May 4**

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**Name**

For this homework set you are allowed to work with other members of either of the geometry classes. However, must cite everyone with whom you have discussed your problem.

In addition, you may **NOT** consult with anyone (except me) when you write your paper explaining your problem(s).

*“The intelligent man finds almost everything ridiculous, the sensible man hardly anything.”* – Johann von Goethe

*“Know thyself?’ If I knew myself, I’d run away.”* – Johann von Goethe

### **Problems**

Remember that you may use any previous problem as part of the justification for your problem(s).

1. **(All)** Do any **two** (2) of the following.
  - (a) Use the Klein model to show that in the hyperbolic plane there exists a pentagon with five right angles and there exists a hexagon with six right angles. You may do this problem by **exhibiting** the appropriate pentagon and hexagon in a carefully drawn picture. That is, you need not articulate a full proof.
  - (b) Prove that we can **construct** (using straightedge and compass) the common perpendicular of the two divergently parallel Poincaré lines  $l$  and  $m$  in the following figure. [One way to approach this is to use the “Power of a point  $O$  relative to the three circles.]
  - (c) Do exercise  $P-6$  of Chapter 7. [Requires algebraic manipulations.]