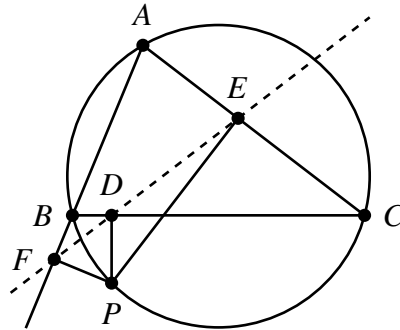


Problem Set #5

MATH 387 : 2015

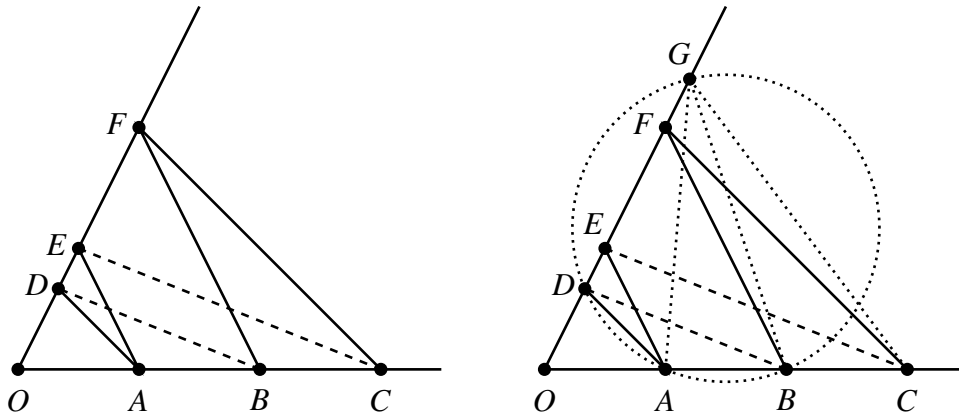
Due: Thursday, 5 February 2015

1. Given a line segment AB , construct a regular pentagon having AB as a side.
2. Given a triangle ABC , consider a point P on its circumscribed circle. Let D , E , and F be the feet of the perpendiculars from the sides of the triangles (extended as necessary) passing through P . Prove that the points D , E , and F are collinear.



Hint. Use cyclic quadrilaterals and [Eucl.I.14](#).

3. Consider two lines intersecting at the point O . Let A , B , and C be points on the first line and let D , E , and F be points on the second line. If AD is parallel to CF and AE is parallel to BF , then prove that BD is parallel to CE .



Hint. Draw the circle passing through the points A , B , and D . Let G be the intersection point between this circle and the second line. Use cyclic quadrilaterals and [Eucl.I.29](#).

Bonus. Complete Levels 13–25 in *Euclid: The Game*. How many Golden medals can you get?

