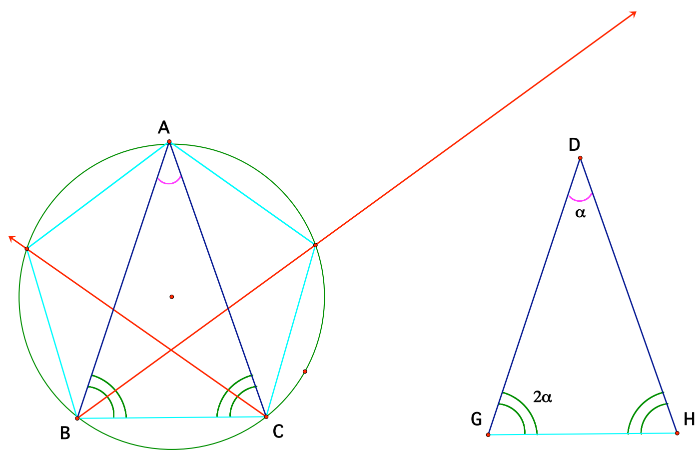
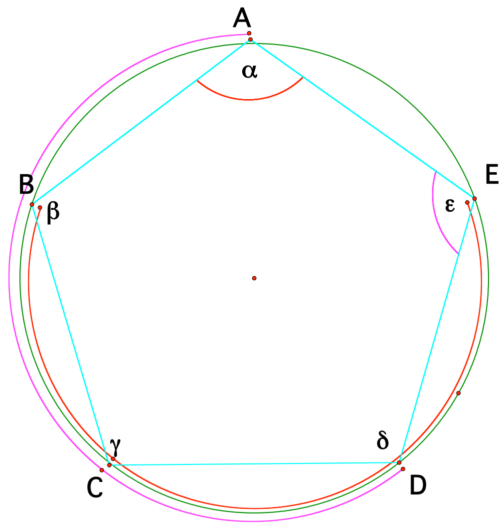
# MT 453 Euclid's Elements


Speaker: Tracy Maciolek
Scribe: Kevin O'Neil


March 18, 2009






**Proposition IV.11**

*To inscribe a regular pentagon in a given circle.*

Proof:
Construct $\triangle FGH$ isosceles so the base $\angle$'s are $2 * top\angle$. [prop. IV.10]
Inscribe $\triangle ABC = \triangle FGH$ in circle [prop. IV.2]
Bisect $\angle ACD$ by $CE$ [prop. I.9]
Bisect $\angle ADC$ by $DB$ [prop. I.9]
Draw $AB, BC, DE, EA$. [post. 1]
$\angle ACE = \angle ECD = \angle ADB = \angle BDC = \alpha = \angle CAD$ [c.n. 1]
$arc\ AE = arc\ ED = arc\ DC = arc\ CB = arc\ BA$ [prop. III.26]
$AE = ED = DC = CB = BA$ [prop. III.29]
$arc\ AB = arc\ ED$. Add $arc\ BCDtoeach.$
$arc\ ABCD = arc\ BCDE$. [c.n. 2]
$\epsilon = \theta$. [prop. III.27]
Similarly, $\epsilon = \theta = \beta = \gamma = \delta$.

Therefore, pentagon ABCDE is equilateral and equiangular, i.e. ABCDE is a regular pentagon.