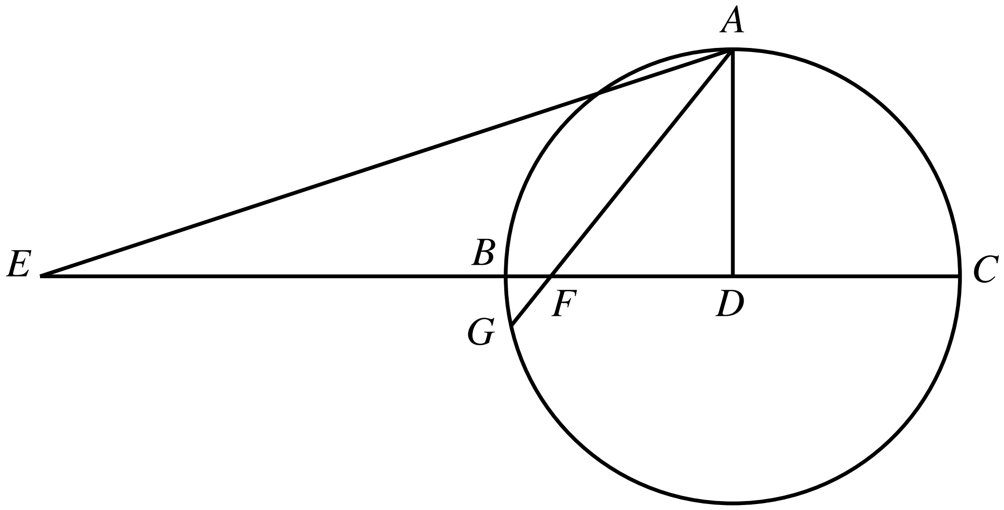
Cusanus excercise



Here is one of the constructions that Cusanus proposed in order to "solve" the circle quadrature (see figure). Let D be the centre of circle $BACG$, of which BC is a diameter and $AD \perp BC$. The point G is chosen so that $AG = 2DF$ (it is not immediately obvious how to find G but suppose that it has been found). Prolong the diameter BC towards E, taking $DE = 4DF$. Now (according to Cusanus) the length of ED equals the arc BAC, and the area of $\triangle AED$ equals half the area of the circle.

1. Prove that Cusanus' assertion amounts to $\pi = \sqrt{\sqrt{320} - 8}$.

Hints: Take $AD = 1$ and $DF = x$. Prove generally that *any* chords in a circle such as AG and BC that intersect in an common point F satisfy the equality $GF \cdot FA = BF \cdot FC$. Use this to derive a biquadratic equation in x. Solve the equation. The rest should be obvious.

2. After you have finished the first excercise, sit back and reflect on it. Write up a (very) brief reflection. Do this individually, even if you did the excercise together.

Hand in next friday.