

Mathematics 3810H – Ancient and classical mathematics
TRENT UNIVERSITY, Fall 2011

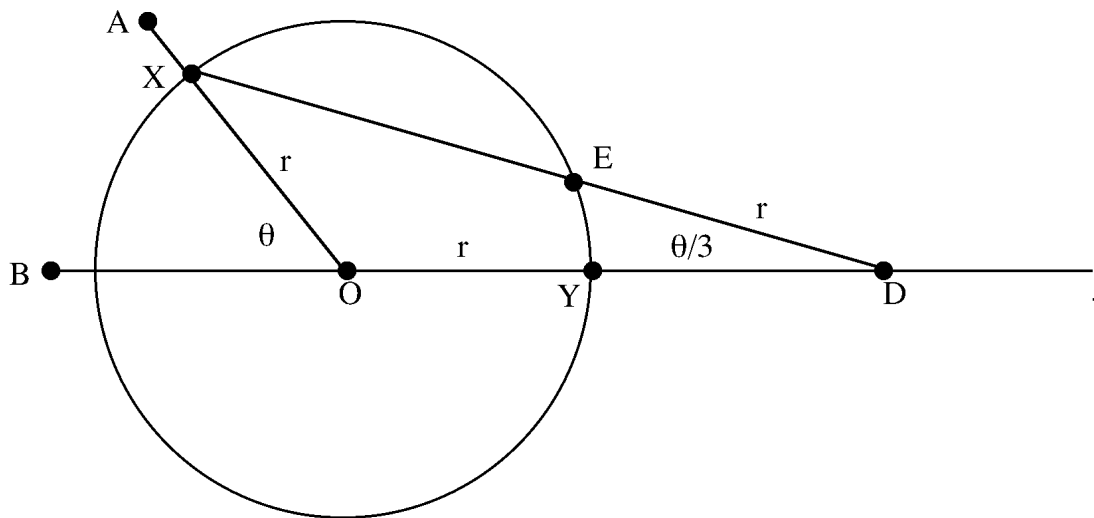
Assignment #4

Due on Monday, 14 November, 2011.

Trisections

1. Consider the following technique for trisecting an angle using a compass and a ruler with two marks (some fixed distance of r apart):

Given that $\angle AOB = \theta$, draw a circle with centre O and radius r . Suppose this circle intersects OA at X and the line extending BO past O at Y . Slide the ruler around until its edge runs through X , one mark is on the line extending OY past Y , and the other mark lies on the circle. Let D be the point on the line where the first mark is and E be the point on the circle where the second mark is. Then $\angle EDY = \theta/3$.



Prove that this technique works. [5]

2. Greek and Hellenistic geometers experimented with various techniques besides to make possible trisections that cannot be accomplished with a compass and straightedge alone. Describe one such technique (other than the one given above) in detail and explain why it works (or fails). [5]