MTH 322 Homework 1

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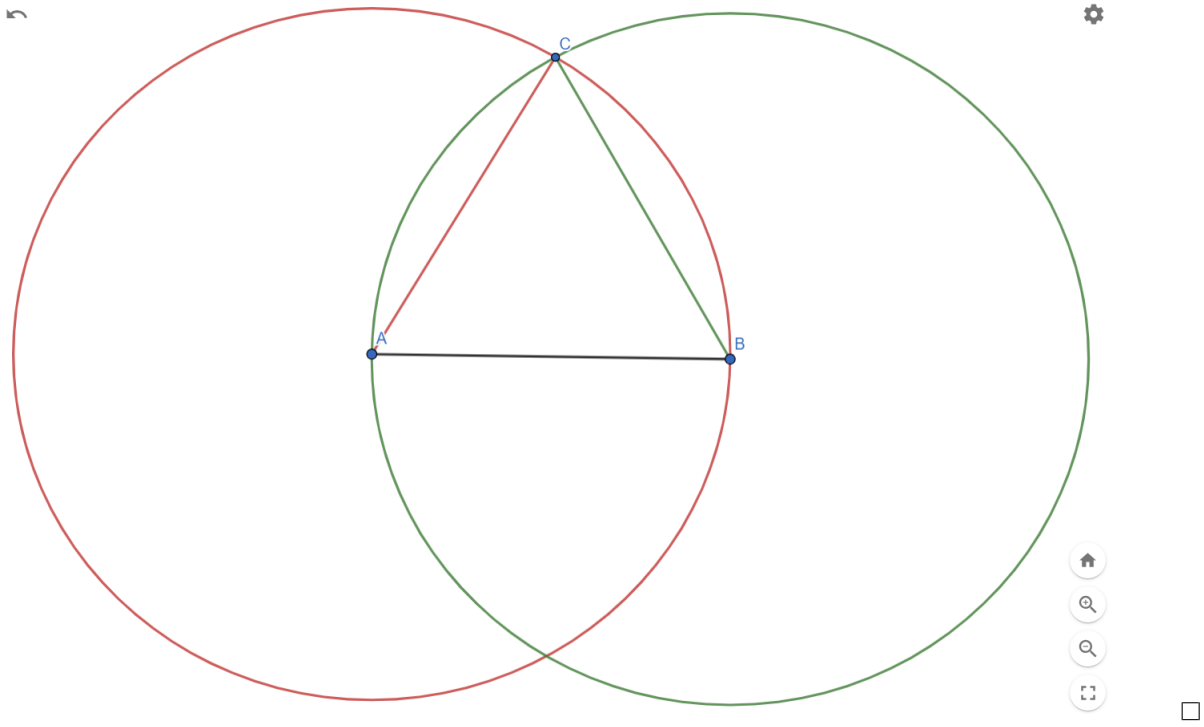
9/17

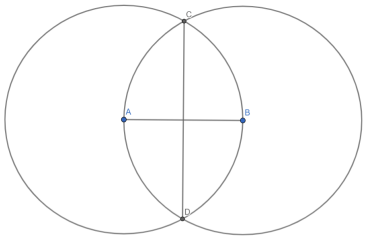
Problem 1. *Proposition 1 details how to construct a equilateral triangle from a given finite line segment.*

Proof. Given a line segment AB, a equilateral triangle is constructed by constructing two circles with radius AB centered at A and B respectivly, then these circles intersect at a point C, then it follows since both circles just constructed have the same radius that both line segments AC and BC are congruent to AB, then by the transitive property, these all have the same length, hence the triangle is equilateral.



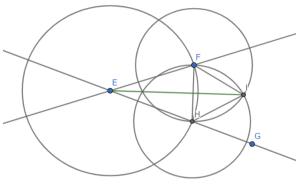
I would recomend Euclids method to construct an equilateral triangle because I can think of no simpler method, the proof is very striaghtforward, so it is easy to see that this process will always yeild the desired result.

Problem 2.

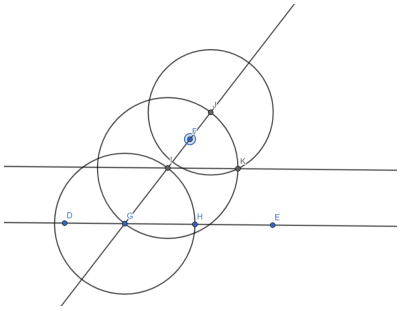


Proof. 1. Consturcting an perp. bisector. In order to preform this

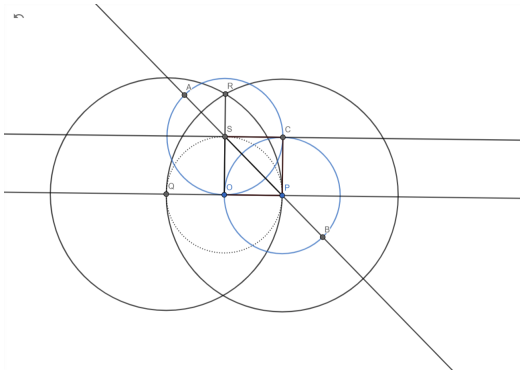
construction I used prop 10 in book 1.



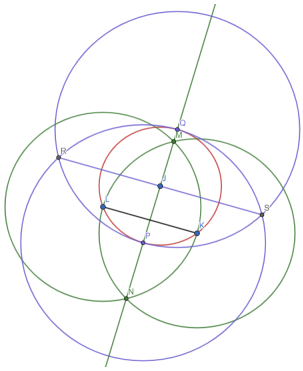
2. Constructing an angle bisector This was proposistion 9 in elements book 1.
3. constructing a line parellel to a line l through a point c not on l



The technique comes primarily from proposistion 31 in elements book 1.



4. Constructing a square of a given side lenth. This is based on proposistion 46 and prop 31, to construct the parallel lines.



5. How to find the center of a circle is given in book 3 proposistion 1.

   The center is given by the intersection of the two differently colored lines.

6. Proposistion 4 in book 9 says that given two numbers n, m such that $n = a^3$ and $m = b^3$, then there exists c such that $mn = c^3$.

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Problem 3. *Library of Alexandria*

Proof. 1. Name three mathematicians (at least two of which had connections togeometry) that are mentioned in the video, and the times (minutes and seconds) at which each is first mentioned.

Three mathematicans mentiond are Eratosthenes (2:53), Hypatia (3:56), and Ptolemy (00:56)

2. What roles do you think or imagine that the Library of Alexandria played in the development of geometry or mathematics in general?

It was probably really imporant so that peoples discoveries could be recoreded and others could access them. With a library, it would be likely that the only way info would travel would be by word of mouth, which would not work well with math. It was definitly a valuable sorce of knowelage for early geomters.

3. What really happened to the Library of Alexandria? It was not really dystroyed by fire since it was visted by scholars for centrurys after the fire, instead it slowly fell out of favor as changing cultures in the region continually viewed the library as a threat rather than a source of pride.

All three loses represent a very sad lose of culture and knoweldge. In the Brazil fire it is estimated that 92 percent of items where lost. This is a way greater loss than what was lost in the intial fire of the library of Alexandria. Not only this but the Brazil museum is much larger, the library of Alexandria only had around 400,000 scrolls (which is still alot) but the Brazil museum ost millions of items in its collection. Notre-Damn is a very important place for religious people, since it is a curch unlike the library of Alexandria and the Brazilian Museum. Notre-Damn also contained a large number of artworks and other relics, although I dont think it had many academic texts.

So far in my life librarys have played an important roll as a source of information. When at home I often use my locally library to get work done and at URI I make use of the librarys reascoureses for my school work and for my own interests. Librarys have fostered interest in math in me since I have spent time in the URI library looking at some of the math books and looking for topics that seem interesting. I think the libraries will effect my future life as I intened to be a lifelong learner.

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Problem 4. *Thrid problem*

Proof. Some islamic scholars are ukridisi who invented the decimal point, Abul Hasan udlisist who included decimals in a book about arithmitic, and Al -Kashi who also wrote a book about arithmtic using decimal points, which were thought to have been invented in the 1600.

I think a big takaway from the video is how many people dont get proper credit for their discoveries and this highlights the importance of studing history so that we can accuratly attribute discoveries to those who have actually discovered it. It was very surprising to see how many supposedly recent discoveries where discovered by people in the east almost a thoushand years ago.

There is value in teaching about the history of geometry (and to a greater exent, all math) precisely because there is some dissagrement. This tells us that there are interesting and stimulating converesations that can be had. I think the most important principle to follow would be to ensure that you are unbaised and not giving some groups more credit than others. Further, It is important to understand the historical development in order to place the importance of subjects and result accuratly. Not to mention that it helps us to understand our own thought proceses.

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