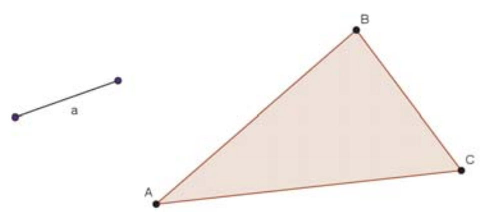
4 Wednesday Agenda

So, remember that problem of coordinate plane having a special point and two special lines whereas Euclid's plane did not have those (that was some socialist country, right there: all points made equal...)

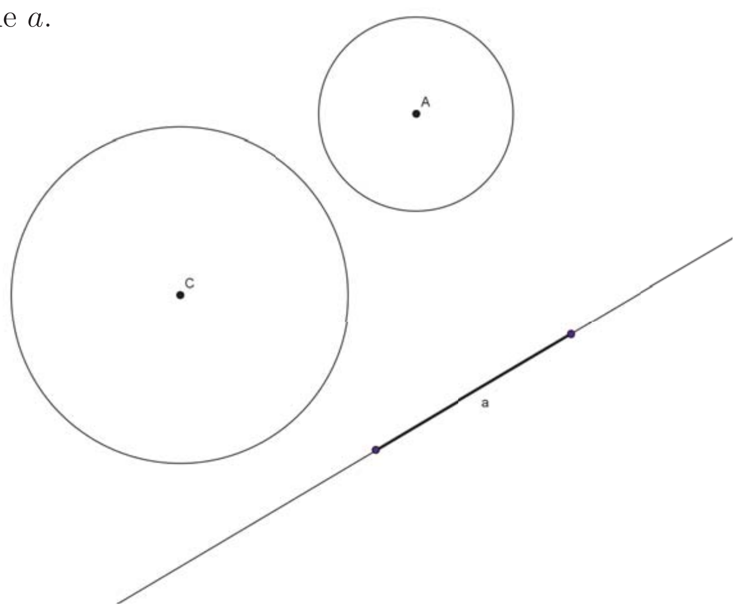
4.1 Translations

1. Definition
   - using vectors explicitly.
   - using vectors implicitly.
2. How do we show that translations preserve length?
3. What else do translations preserve?
4. Group of translations $\mathcal{T}$
5. Students often think of translations as translating in the left/right direction, then up/down direction. Why might this be a problem, and why isn't it?

Question 4.1. In $\triangle ABC$ "inscribe" a line segment equal and parallel to the given segment a.



Question 4.2. Two circles c_1 and c_2 and a line ℓ are given. Locate a line, parallel to ℓ, so that the distance between the points at which this line intersects c_1 and c_2 is equal to a given value a.



Question 4.3. This is one of those: what's the shortest path between two points kind of problems that we dress up with a little context:

Two cities, Parallelofield and Circleville, are separated by a river. They'd like to build a road between the two for the most efficient travel and you're the engineer. Or whoever builds bridges. As always, this context is totally unimportant :) So, umm, where would you build the bridge?

Extension What if there are several rivers between the two cities?

4.2 Rotations

1. Definition:
   - using an angle θ explicitly.
   - using an angle θ implicitly.
2. How do we show that rotations preserve length?
3. What else do rotations preserve?
4. Compositions of rotations
5. Group of rotations $\mathcal{R}$
6. Students' understanding of rotations