



The University of Georgia

Mathematics Education
EMAT 4680/6680 Mathematics with Technology
Jim Wilson, Instructor

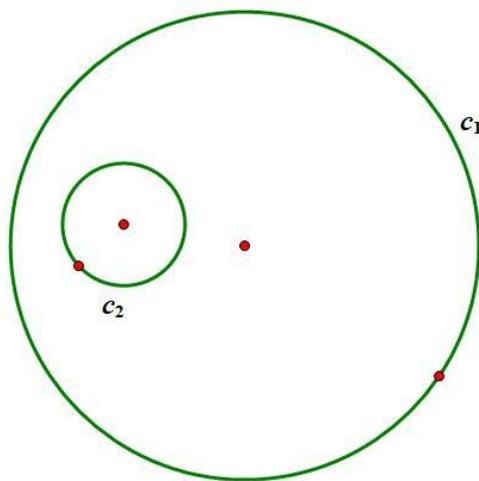
Tangent Circles

By: Lindsey Harrison

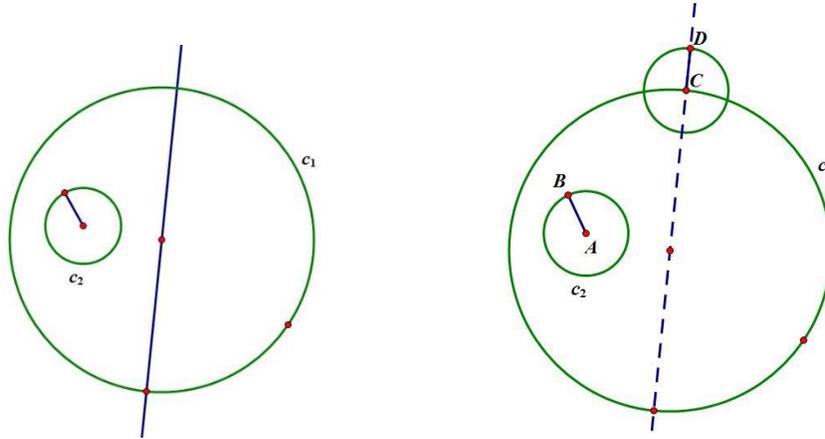
Objective: We will first go through the construction of tangent circles. We will then explore three different cases: when one given circle lies completely inside the other, when the two given circles overlap, and when the two given circles are disjoint.

Construction:

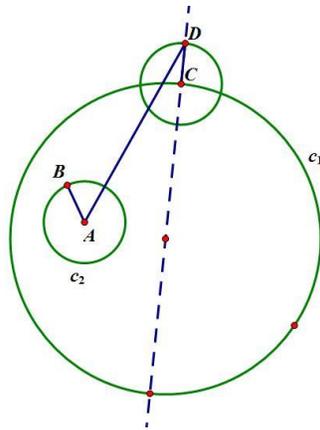
1. First construct two circles, c_1 and c_2 . We will be creating a circle tangent to both c_1 and c_2 .



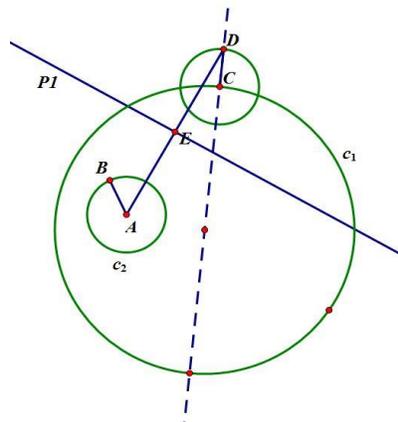
2. Next select an arbitrary point C on the circle c_1 . Then construct a line through the center of c_1 and through point C . Then create a circle centered at point C with radius length AB .



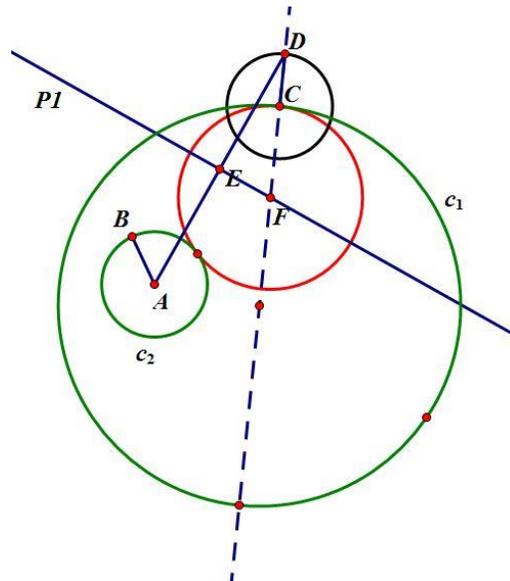
3. Next construct the line segment AD .



4. Then construct the perpendicular bisector of the line segment AD .



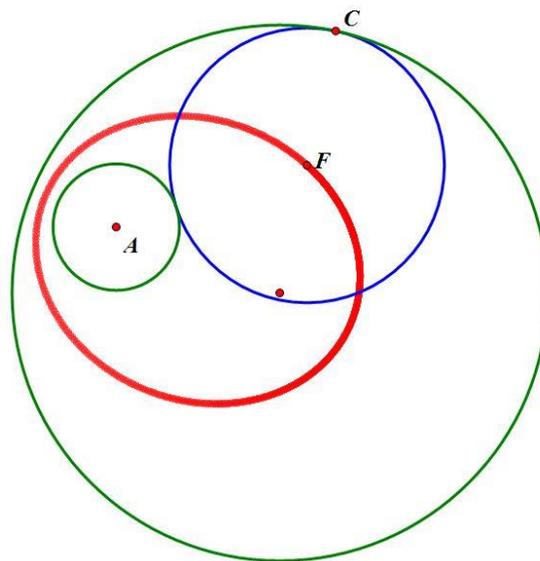
5. The point of intersection of lines AD and the diameter drawn for the circle c_1 is labeled F . This is the center of the circle drawn in red that is tangent to both c_1 and c_2 through the given point C .



Case One:

We will first explore the case when one circle is completely contained within the other. This case was constructed in the above construction portion of the write-up. The following link shows the trace of the center of this tangent circle: [GSP FILE](#)

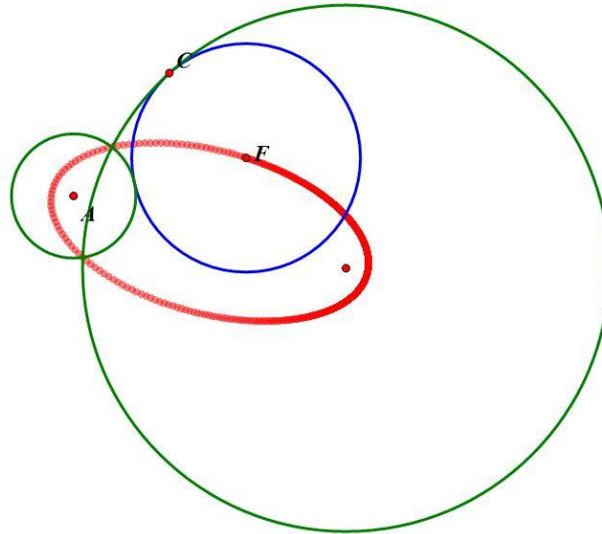
The trace of the center of the tangent circle creates an ellipse.



Case Two:

Next we will explore the case when one circle intersects the other circle. The following link shows the trace of the center of this tangent circle: [GSP FILE](#)

The trace of the center of the tangent circle again creates an ellipse.



Case Three:

The last investigation will explore the case when the two circles are disjoint. The following link shows the trace of the center of this tangent circle: [GSP FILE](#)

The trace of the center of the tangent circle creates a hyperbola. The foci of the hyperbola appear to be the centers of the circles c_1 and c_2 .

