Grant Seaburg

Homework 11, Problem 11

Proof:

11. Let ABC be a triangle. Show there is a circle tangent to lines AB, AC, and BC which lies outside the triangle (See Figure 6). Make your own figure in Sketchpad, showing the critical elements used to construct this circle. Such a circle is said to be *escribed* to the triangle. Notice that there are three escribed circles to a given triangle, while there is only one inscribed triangle.

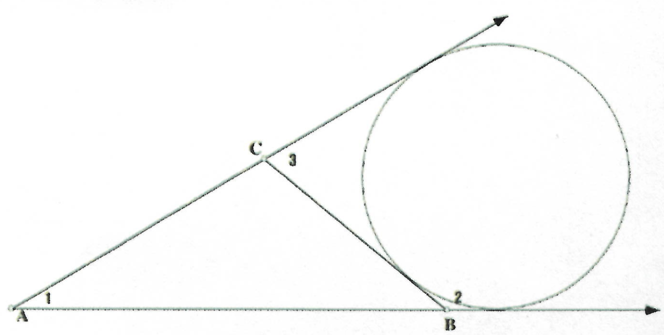
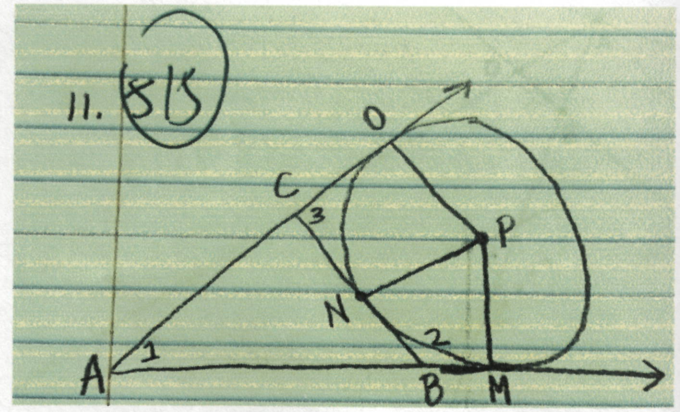


Figure 6



1. By Homework 6, Problem 5, P is the intersection of the angle bisectors of angle 1, angle 2, and angle 3, MP is perpendicular to AB, NP is perpendicular to BC, and OP is perpendicular to AC, as well as MP=NP=OP.
2. By definition of a circle, MP, NP, and OP are radii and P is the center.
3. By Theorem 43, OP is tangent to AC, NP is tangent to BC, and MP is tangent to AB.
4. Therefore, it is possible to have a circle escribed from a triangle which is tangent to all three sides.