Mathematics 2260H – Euclidean Geometry TRENT UNIVERSITY, Winter 2025 Assignment #3 Triangles and Angles II Due on Friday, 31 January.*

As in Assignment #2, in this assignment you may freely use the fact that in the Euclidean plane the sum of the interior angles of any triangle is equal to the sum of two right angles.

1. Under what conditions does the Side-Side-Angle congruence criterion for triangles – given triangles $\triangle ABC$ and $\triangle DEF$, if |AB| = |DE|, |BC| = |EF|, and $\angle ACB = \angle DFE$, then $\triangle ABC \cong \triangle DEF$ – actually work? Prove your assertions. [5]



2. Suppose O is the centre of a circle, AB is any chord of the circle, and C is any other point on the circle. Show that $\angle AOB = 2 \angle ACB$. [5]

Hint: The special case where AC is a diameter of the circle was taken care of on Assignment #2. It can be used to help prove the two other cases – where O is, respectively, inside/outside $\triangle ABC$ – illustrated above.

Medicine makes people ill, mathematics makes them sad, and theology makes them sinful.

Martin Luther (1483-1546)

There are two ways to do great mathematics. The first way is to be smarter than everybody else. The second way is to be stupider than everybody else – but persistent. Raoul Bott (1923-2005)

^{*} Please submit your solutions, preferably as a single pdf, via Blackboard's Assignments module. If that fails, please submit them to the instructor on paper or via email to sbilaniuk@trentu.ca as soon as you can.