

**Geometry**  
**Quiz 7**

**Name:** \_\_\_\_\_

You have 10 minutes to complete this quiz. If you have a question raise your hand and remain seated. In order to receive full credit your answer must be **complete**, **legible** and **correct**. Show your work, and give adequate explanations.

- (1) Let  $\Gamma$  be a circle centered at  $O$  with radius  $\overline{OA}$ . Show that a line perpendicular to  $OA$  at  $A$  is tangent to  $\Gamma$ .

Let  $\ell$  be perpendicular to  $OA$  at  $A$ . Choose any point  $B \neq A$  on  $\ell$ .  $OAB$  is a triangle with right angle  $\angle OAB$ , so by the Exterior Angle Theorem  $\angle OAB$  is larger than  $\angle OBA$ . Since the larger angle is subtended by the larger side, this yields  $\overline{OA} < \overline{OB}$ , which puts  $B$  outside  $\Gamma$ . Since this is true for any  $B \neq A$  on  $\ell$ , we get that  $\ell$  meets  $\Gamma$  in one point, namely  $A$  (which is what it means for  $\ell$  to be tangent to  $\Gamma$  at  $A$ ).