MORE EXERCISES FOR WEEK 7

For these exercises the geometrical settings vary, so make sure you are working in the right type of system.

1. Let Γ be a circle in a Euclidean plane with center Q, and let L be a line such that $Q \notin L$ and $\Gamma \cap L$ consists of the two points A and B. Prove that the minor arc joining A to B consists of A, B and all points in $\Gamma \cap \mathrm{Int} \angle AQB$. [*Hint:* Use Exercise 9.2 and the Crossbar Theorem.]

2. Explain why the conclusions of Exercises 9.1–9.3 remain true in a neutral geometry. [*Hint:* Look at the solutions give for these exercises.]

3. Assume we are in a neutral plane which satisfies the following condition:

> *If two parallel lines are cut by a transversal line, then the pairs of consecutive angles are supplementary* (*the sum of their measures is* $180°$).

Prove that the Playfair's Postulate is true in the given plane. [*Hint:* Look at Equivalent Statement 14 in the list on page 13 of `lecture14.pdf`.]

4. State whether the assertion

> *On a sphere in coordinate 3-space, a* $45°$ *latitude circle is a great circle*

is true or false and give reasons for your ahswer.