Locus Construction 3

In the applet below, *A* is the *center* of the circle, *B* is a point *outside* the circle, and *C* is a point that lies *on* the circle.

1) Construct a ray with endpoint *A* that passes through *C*.

2) Construct the perpendicular bisector of $\overline{BC}$.

3) Construct the point of intersection of the ray and segment you constructed in (1) & (2) above. If necessary, right click on this point and rename it *D*.

4) Right click on this point *D.* Select **Trace On**.

5) Select the **Move** arrow. Now, drag point *C* around the circle and watch the trace of *D*. What does this trace look like?

6) Move point *B* to a different location. Clear the trace. Repeat step (5). What does this trace look like?

7) Clear the trace once more. What can you conclude about the distances *CD* and *BD*? (If you're totally stumped, feel free to measures these distances.)

8) What previous theorem justifies your observation in (7) above? (Don't just "name it". *Write it out in words!*)

9) Fill in the blank to make a true statement:
Since the radius of a circle never changes, it is said to be _____.

Thus, we can say that the value *AD* – *CD* is _____.

10) Given your results for (7) & (9), what can you conclude about the value $AD - BD$?

11) How would you describe the pink locus (set of points that meet a certain condition) in the applet below? That is, how can you *geometrically* define the term you wrote as a response to (5) and (6) above?