**Activity 2.7.3 Construction of a Line Perpendicular to a Line
at a Point on the Line**



**Construction**

Given: Point *C* lies on $\overleftrightarrow{AB}$.

To construct: a line through *C* that is
perpendicular to $\overleftrightarrow{AB}$.

Steps in the construction:

1. Construct the circle with center *C* passing through *A.*
2. Label the other point where the circle intersects $\overbar{AB}$ as point *D*.
3. Construct the circle with center *A* passing through *D.*
4. Construct the circle with center *D* passing through *A.*
5. Label point *E*, one of the points where these last two circles intersect.
6. ****Draw the line through *C* and *E*.

Claim: $\overleftrightarrow{CE}$ $⊥$ $\overleftrightarrow{AB}$

**Proof**

1. Construct segments $\overbar{AE}$ and $\overbar{DE}$.
2. *CA = CB* because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. *AD = AE* because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. *DA = DE* because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. From step 3 and step 4 we conclude that *AE = DE*. Why?
6. *CE = CE* because of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ property
7. From steps 2, 5, and 6 we can show that ∆*ACE* $≅$ ∆*DCE* using the \_\_\_\_\_\_\_ Congruence Theorem.
8. $∠ACE$ $≅$ $∠DCE$ because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. $Explain why step 8 allows us to conclude that \overleftrightarrow{CE}$ $⊥$ $\overleftrightarrow{AB}$