Circumcenter Investigation Name: ___________________________________________ A#___

1. Pick one side of your triangle. Use the ruler to find the midpoint.
2. Draw a line going through the midpoint that is perpendicular to the segment. You may either use a protractor or a corner to create the right angle. Extend your line all the way through the triangle to the ends of the paper.
3. Repeat steps 1 and 2 for the other two line segments.
4. What type of triangle do you have (acute, right, or obtuse)?

5. You just created a perpendicular bisector for each side of your triangle. What do you notice about the perpendicular bisectors?

6. Label the point of intersection A. Is the point of intersection inside your triangle, outside your triangle, or on your triangle?

7. Measure the distance from point A to each of the three vertices of your triangle. Record those measures below. What do you notice about these measures?

8. Use the compass to draw a circle using point A as the center and the distance from step 7 as your radius.
9. What do you notice about the relationship between the circle and the triangle you had?

Be prepared to share your answers out the class. If you finish early flip the back and start working on your proof.

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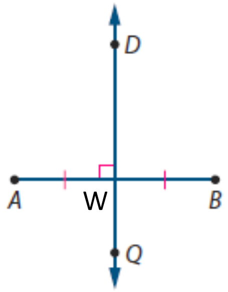
We discovered that we can create the circumcenter of a triangle by finding the point of concurrency of all the perpendicular bisectors. We also saw that the circumcenter is equidistant from all of the vertices of the triangle. This idea can be generalized to show that any point on a perpendicular bisector is equidistant from the endpoints of the segment. Fill in the blanks of the following proof to show this is true.

Given $\overleftrightarrow{DQ}$ is a perpendicular bisector of $\overline{AB}$, prove DA=DB.




| Statements | Reasons |
|---|---|
| $\overleftrightarrow{DQ}$ is a perpendicular bisector of $\overline{AB}$ | |
| W is the midpoint of $\overline{AB}$ | |
| | Definition of Midpoint |
| $\overline{AW} \cong \overline{WB}$ | |
| | Definition of perpendicular |
| $m\angle AWD = 90°$<br>$m\angle BWD = 90°$ | |
| $m\angle AWD = m\angle BWD$ | |
| | Definition of Congruence |
| | Reflexive |
| $\Delta AWD \cong \Delta BWD$ | |
| | CPCTC |
| DA=DB | |

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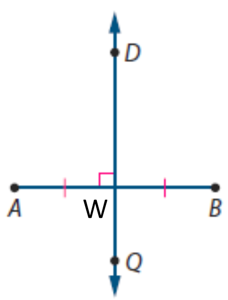


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