Locus Construction (II)

You’ll need the following materials for this activity:

1 piece of wax paper
Compass
Pen/Pencil

1) On your piece of wax paper, use your compass to construct a fairly large circle. (Be sure to make the radius small enough so that the entire circle is contained on the wax paper.

2) Plot and label the center point of your circle. Label this point \( A \).

3) Plot and label another point in the interior of this circle. Label this point \( D \).

4) Plot approximately 20-25 points on the circle. (Just draw dots to represent these points). Label any one of these 20-25 points as \( B \).

5) Take the wax paper and fold it so that point \( B \) lies on top of point \( D \). Crease sharply.

6) Repeat step (5) above for all the other points you plotted on the circle (back in step 4). That is, treat each point on the circle as another “point \( B \).” Simply fold each “point \( B \)” on the circle to point \( D \). Be sure to crease sharply each time!

7) Take a look at the wax paper. What do you see? Describe as best you can.
8) Let’s analyze this again. Consider the following diagram below. Fold point $B$ onto point $D$ just one more time.

9) This fold line is called the ___________________________ ___________________________ of $BD$.

10) Every point on this ___________________________ ___________________________ of $BD$ is ______________________ from points _______ and _______.

11) Label the point where this fold line crosses radius $\overline{AB}$ as $E$. 

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Did you know that Point E is actually a point that lies on the curve that you generated by the paper folding activity on the previous page? It does. So what’s so special about all those point E’s that lie on the curve you generated on the wax paper? Let’s find out:

12) Since the radius of a circle never changes, it is said to be __________________.

Since the radius of a circle is always __________________, we can conclude that radius $\overline{AB}$ (which has a length denoted as $AB$) is __________________. But wait!

$AB = \underline{_______} + \underline{_______}$ (made obvious from the diagram).

Since point E lies on the ________________ ______________ of ___, we can conclude that _______ = _______ due to what was expressed in (10) above.

Since $AB = \underline{_______} + \underline{_______}$ is always a ________________ value, we can conclude, upon simple substitution, that the value _______ + _______ must always remain____________ as well!

The bold phrase in the sentence above applies for every point E that can be generated through this paper folding process described above!