Problem 1 – A Segment and its Perpendicular Bisector

*The **perpendicular bisector** of a segment is a line, ray, or segment that is:*

- *perpendicular to the segment and*
- *intersects the segment at its midpoint.*

On page 1.3, construct $\overline{AB}$ and its perpendicular bisector $\overline{PX}$ such that $\overline{AB}$ and $\overline{PX}$ intersect at point *X*.

1. Record your measurements found on page 1.3:

$m\angle PXA$ = ______________ AX = ______________

$m\angle PXB$ = ______________ BX = ______________

2. Do these measurements support the two-part definition of a perpendicular bisector? Explain.

Problem 2 – The Perpendicular Bisector Theorem

On page 2.2, draw $\overline{PA}$ and $\overline{PB}$. Measure the lengths of these two segments.

3. Record the measurements for a few locations of point *P*:

Length of $\overline{PA}$	**Length of $\overline{PB}$**

4. *Complete this conjecture:*

Any point on the perpendicular bisector of a line segment is ________________ from the endpoints of the segment.

5. What kind of triangle is $\triangle ABP$? How do you know?

Problem 3 – Isosceles Triangles and Kites

On page 3.2, draw point *Q* on the perpendicular bisector such that it is on the opposite side of $\overline{AB}$ as point *P*. Construct $\overline{AQ}$ and $\overline{BQ}$, and measure and display the following lengths: *AP*, *BP*, *AQ*, and *BQ*.

6. Name two isosceles triangles in the diagram on page 3.2.

7. Identify the pairs of congruent sides of kite *APBQ*.

__________ ≅ __________ __________ ≅ __________

8. Describe a property of kites using the word “equidistant.”

9. *Complete this conjecture:*

In a kite, ___________________ is the perpendicular bisector of ___________________.

10. Drag points *P* and *Q* to the *same* side of $\overline{AB}$ to create a concave kite.
Do the properties of kites still hold?

Problem 4 – Chords of a Circle

On page 4.2, construct a circle with center *P* and a chord $\overline{AB}$.
Then construct the perpendicular bisector of $\overline{AB}$.

11. *Complete this conjecture:*

In a circle, the perpendicular bisector of any chord _______________________________.

12. Describe a property of circles using the word “equidistant.”