Date _____ Item _____

30-60-90 Triangle Discovery

1. Observe ΔPQR. Use patty paper to trace one of the angles, and then compare it to the other angles. Confirm that the triangle is equiangular.

   Use what you know about the sum of the angles in a triangle to determine the angle measures.

   $\angle P =$ ____ $\angle Q =$ ____ $\angle R =$ ____

   Record the measures for $\angle P$ and $\angle R$ on the diagram. Do not record the measure for $\angle Q$ on the diagram.

2. Use a straightedge to draw an altitude starting at point Q. This altitude should intersect $\overline{PR}$ where you see a point. Label this point S.

   Use what you know about altitudes and the sum of the angles in a triangle to determine the angle measures.

   $\angle QSR =$ ____ $\angle SQR =$ ____

   Record the measures for $\angle QSR$ and $\angle SQR$ on the diagram.

3. Use patty paper to trace ΔQRS and compare it to ΔQPS. What do you notice?

   _____

   _____

   _____

4. Focus on the full triangle again-- ΔPQR. Use patty paper to trace one of the sides, and then compare it to lengths of the other sides. Confirm that the triangle is equilateral.

   The triangle is shown on centimeter paper. Record the lengths of the following segments.

   $\overline{RS} =$ ____ $\overline{QR} =$ ____

   How did you determine the measure of $\overline{QR}$?

   _____

   _____

5. Use the Pythagorean Theorem for ΔQRS to determine the exact length of $\overline{QS}$. Show your work below, and then record the length of $\overline{QS}$ on the diagram.

6. Observe ΔTUV. Confirm that ΔTUV is equiangular and equilateral.

   Use a straightedge to draw an altitude starting at point T. This altitude should intersect $\overline{UV}$ where you see a point. Label this point W.

   Determine the following angle measures and exact lengths, and record them below and on the diagram. If you use the Pythagorean Theorem, show your work.

   $\angle U =$ ____ $\angle TWU =$ ____ $\angle WTU =$ ____

   $\overline{TU} =$ ____ $\overline{UW} =$ ____ $\overline{TW} =$ ____

7. Observe ΔXYZ. Confirm that ΔXYZ is equiangular and equilateral.

   Use a straightedge to draw an altitude starting at point X. This altitude should intersect $\overline{YZ}$ where you see a point. Label this point A.

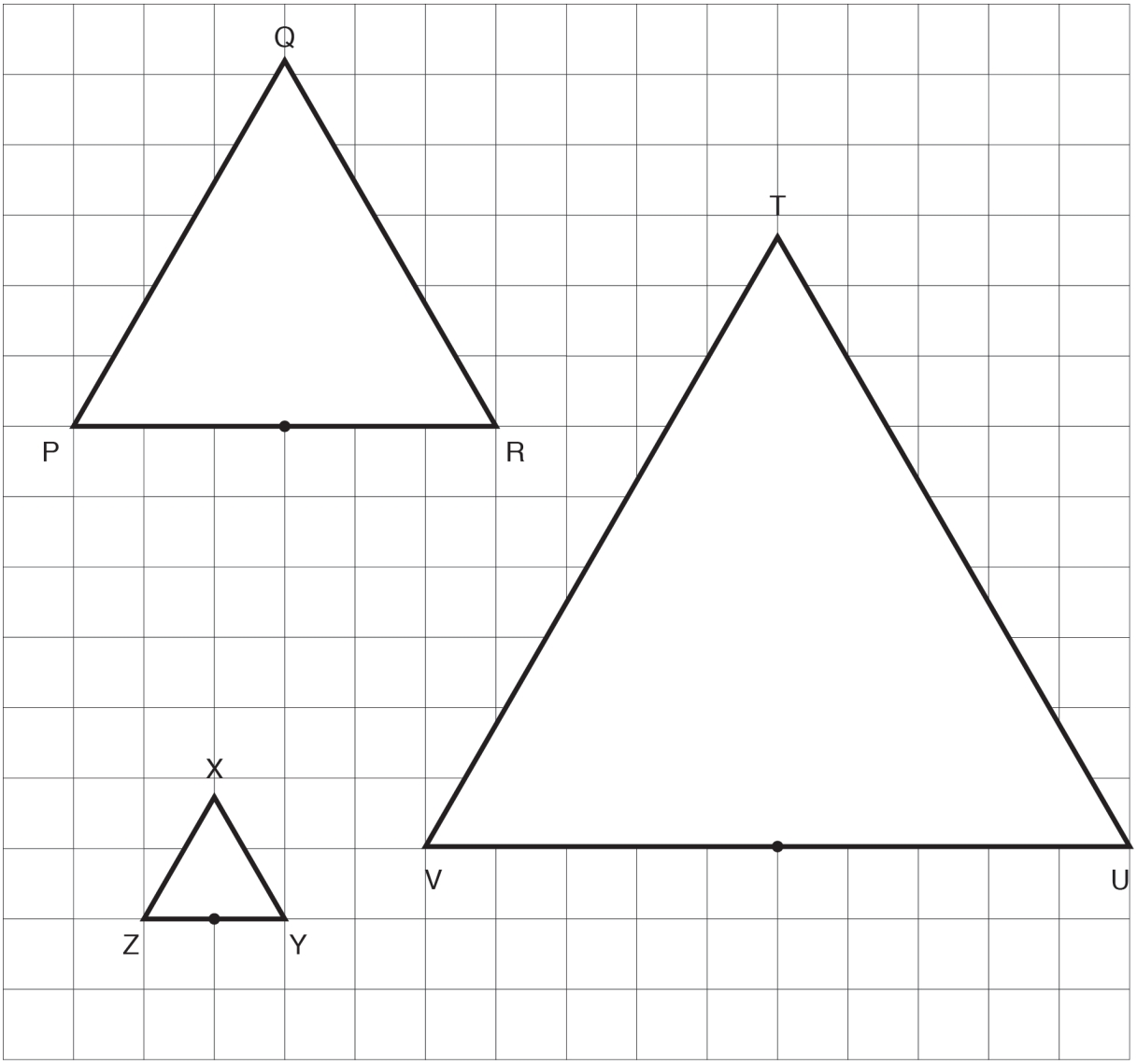
   Determine the following angle measures and exact lengths, and record them below and on the diagram. If you use the Pythagorean Theorem, show your work.

   $\angle Y =$ ____ $\angle XAY =$ ____ $\angle AXY =$ ____

   $\overline{XY} =$ ____ $\overline{AY} =$ ____ $\overline{AX} =$ ____

8. Share your discuss your results with a partner. Look for patterns in the relationship of the sides. Try to complete the following conjecture.

In a 30-60-90 triangle, if the leg opposite the 30-degree angle has length x, then the leg opposite the 60-degree angle has length _____ and the hypotenuse has length _____.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