Goal: 18 points
Total: 25 points

1. Draw, and label, quadrilateral $ACBD$. (1)

2. Is the center of a circle part of the circle? Explain why or why not. ($\star$ 4)

3. Draw, and label, heptagon $AOPSFTW$. (1)

4. Consider $\triangle ABC$ and $\triangle DEF$. If $\triangle ABC \cong \triangle DEF$ and $\triangle ABC \cong \triangle EFD$, what are the values of $\angle A, \angle B, \angle C$? (2)

5. Generalizing, if $A_1 A_2 ... A_n \cong B_1 B_2 ... B_n$ and $A_1 A_2 ... A_n \cong B_2 B_3 ... B_n B_1$, prove $A_1 A_2 ... A_n$ is a regular polygon. ($\star$ 4)

6. $P, Q, R, S,$ and T are on line k such that Q is the midpoint of $\overline{PT}$, is the midpoint of $\overline{QT}$, and S is the midpoint of $\overline{RT}$. If $PS = 9$, then what is PT? (3)

7. Points A, B, C, D and E are five points on a line segment with endpoints A and E. The points are in the order listed above from left to right such that $CD = AB/2$, $BC = CD/2$, $AB = AE/2$, and $AE = 12$. What is the length of $\overline{AD}$? (3)

8. Two circles and three straight lines lie in the same plane. If neither the circles nor the lines are coincident (meaning the two circles are different and the three lines are all different lines), what is the maximum possible number of points at which at least two of the five figures intersect? (3)

9. Suppose $P, A, B, C,$ and D are points in the plane such that $\triangle PAB \sim \triangle PCD$. Prove that $\triangle PAC \sim \triangle PBD$. ($\star$ 4)