Math 667
Homework Questions #7

Remark: Each answer will be graded on the basis of its correctness, its logical structure, and how well it is written (style, form, spelling and grammar).

26. Find all of the generators of the groups $R_7$ and $R_8$.

27. Is $D_3$ cyclic?

28. Is every subgroup of $S_3$ cyclic?

29. Is every subgroup of $S_4$ cyclic?

30. Show that if $\sigma \in S_n$ and $\tau \in A_n$, then $\sigma^{-1}\tau\sigma \in A_n$. [Hint: State and prove a Lemma that relates $\text{sgn} \sigma^{-1}$ and $\text{sgn} \sigma$.]

31. Label the corners of a square to consider the symmetry group of the square as a subset of $S_4$. Which symmetries of the square correspond to elements of $A_4$?

32. Write down the equations for the symmetry of a circle with center at the origin formed by rotating the circle counterclockwise through an angle $\theta$.

33. Write down the equations for the symmetry of a circle with center at the origin formed by reflecting the plane around the line $y = 2x$. 