Mathematics 546

1. Give the operations table for the group $\mathbf{Z}_{12}^*$. (This is the group of elments in $\mathbf{Z}_{12}$ that are relatively prime to 12 with the group operation being multiplication.)

2. Find the cyclic subgroup generate by each member of $\mathbf{Z}_{12}^*$ and give its order.

3. Is $\mathbf{Z}_{12}^*$ cyclic? Justify your answer.