Modern algebra I, fall 2014. NAME:

Quiz 3

1. Mark the boxes that are followed by correct statements.

□ Any homomorphism from $S_3$ to $S_4$ is trivial (takes $S_3$ to the unit element of $S_4$).
□ Any abelian group of order 27 is cyclic.
□ Any group of order 25 is abelian.
□ For a finite group $G$ and a prime $p$, all Sylow $p$-subgroups of $G$ are conjugate.
□ Any 2-Sylow subgroup of the dihedral group $D_5$ is normal.
□ Dihedral group $D_4$ of symmetries of a square has trivial center.
□ The group of rigid motions of a cube is isomorphic to $S_4$.

2. Consider the alternating group $A_4$.

(a) What is the order of $A_4$?

(b) How many elements does a Sylow 2-subgroup of $A_4$ have?

(c) Find one such subgroup and list its elements.

(d) Find one Sylow 3-subgroup of $A_4$ and list its elements.