

**18.703 HOMEWORK #4, DUE THURSDAY MARCH 14TH**

1. Herstein, Chapter 2, §5, 1.
2. Show that  $H = \{ I, R, R^2, R^3 \}$  is a normal subgroup of the dihedral group  $D_4$ .
3. Herstein, Chapter 2, §5, 12.
4. Herstein, Chapter 2, §5, 17.
5. Let  $G = S_3$  and  $H = \{ e, (1, 2) \}$ .
  - (i) Write down all the left cosets of  $H$  in  $G$ .
  - (ii) Write down all the right cosets of  $H$  in  $G$ .
  - (iii) Is every left coset of  $H$  a right coset of  $H$ ?
6. Herstein, Chapter 2, §5, 26.
7. Herstein, Chapter 2, §5, 27.
8. Herstein, Chapter 2, §5, 37.
9. Herstein, Chapter 2, §5, 43.
10. Herstein, Chapter 2, §5, 49.
11. **Challenge Problem:** Herstein, Chapter 2, §5, 52.

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