MAT 334
Fall 2017
Homework 5
Due: Thursday, November 2

Directions: *Write careful solutions to each of the following problems on separate sheets of paper. You may put more than one solution on a page if you have room. Your solutions must be your own, but you are encouraged to discuss these problems with your classmates. In the event that you discuss problem(s) with your classmates, cite them by stating at the top of the page who you worked with/received help from. Each problem is worth 5 points.*

1. Do exercise 18 on page 84 of the text.

2. Recall that if σ is a permutation of a set A, then the orbits of σ are a partition of A.

   (a) Find the orbits of $\sigma = \left(\begin{smallmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 3 & 5 & 4 & 1 & 2 & 6 \end{smallmatrix}\right)$.
   (a) Find the orbits of $\sigma : \mathbb{Z} \to \mathbb{Z}$, where $\sigma(n) = n - 2$.
   (b) Find the orbits of $\sigma : \mathbb{Z} \to \mathbb{Z}$, where $\sigma(n) = n + 1$.

3. Prove that S_n is a nonabelian group for $n \geq 3$.