

1. No,  $(13)(12)(13)^{-1} = (23)$  is not in  $H$ .

2. For every  $\alpha$  in  $S_n$ ,  $\alpha A_n \alpha^{-1}$  is even.

6. No. Let  $A = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$ . Then  $A$  is in  $H$  and  $B$  is in  $GL(2, \mathbf{R})$  but  $BAB^{-1}$  is not in  $H$ .

13. Observe that  $aHbH = abH = baH = bHaH$ .

38. 3, 6, 15, 30.