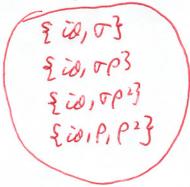
6. Recall that  $D_3$  is the smallest subgroup of the group of rigid motions which contains  $\rho$  and  $\sigma$ , where  $\rho$  is rotation counter clockwise by 120° fixing the origin and  $\sigma$  is reflection of the xy plane across the x axis. List 4 subgroups of  $D_3$  in addition to  $D_3$  and  $\{id\}$ . (I do not need to see any details.)



7. The Dihedral group  $D_4$  consists of 8 elements id,  $\rho$ ,  $\rho^2$ ,  $\rho^3$ ,  $\sigma$ ,  $\sigma\rho$ ,  $\sigma\rho^2$ , and  $\sigma\rho^3$ . In class we calculated that  $\rho\sigma = \sigma\rho^3$ ,  $\rho^4 = \mathrm{id}$ , and  $\sigma^2 = \mathrm{id}$ . Express  $\rho^2\sigma\rho\sigma$  in the form  $\sigma^i\rho^j$  for some integers i and j, with  $0 \le i \le 1$ , and  $0 \le j \le 3$ .