

7. Let  $H$  be the subgroup  $\{(1), (12), (13), (23), (123), (132)\}$  of  $S_4$ . Let  $x$  be the element  $(124)$  of  $S_4$ , and let  $[x] = \{y \in G \mid xy^{-1} \in H\}$ . List the elements of  $[x]$ . (Each element of  $[x]$  should appear in your list exactly once.)

The elements of  $[x]$  are

$$\begin{aligned} (1)(124) &= (124) \\ (12)(124) &= (24) \\ (13)(124) &= (1243) \\ (23)(124) &= (1324) \\ (123)(124) &= (13)(24) \\ (132)(124) &= (243) \end{aligned}$$

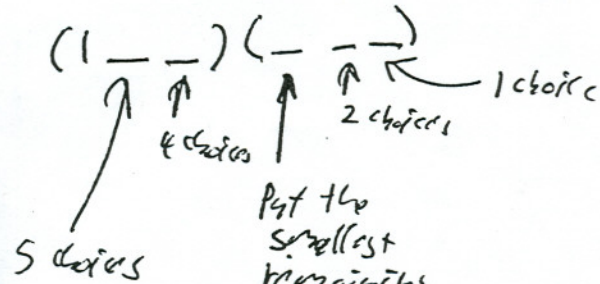


8. How many permutations in  $S_6$  have order 3? Explain your answer.

$S_6$  has  $2 \cdot \binom{6}{3}$  3-cycles

$S_6$  has  $5 \cdot 4 \cdot 2$  elements of the form  $(abc)(def)$

because we may as well put 1 first



$S_6$  has  $40 + 40 = 80$  elements of order 3

Put the smallest remaining number here