Math 3103 Combinatorics (Luecking) NAME:_____

(Please print clearly)

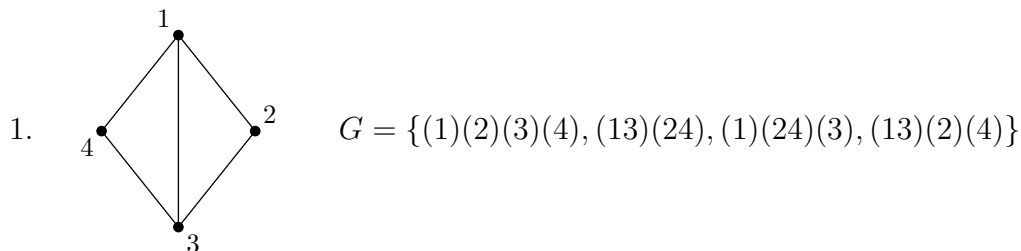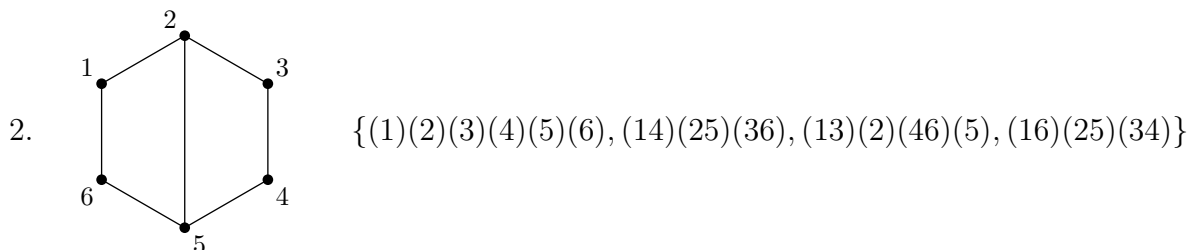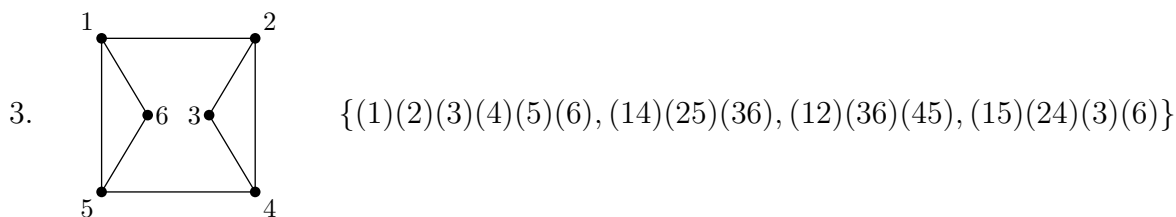Thirteenth Quiz (solutions) Due November 29, 2023

For the figures below I have given the group of rigid motions, expressing the elements as permutations of the vertex labels (in disjoint cycle notation). For each figure, determine the number of distinguishable colorings of the vertice (a) when there are 2 colors to choose from, and (b) when there are 5 colors to choose from. Do not simplify either of these.

1.

$G = \{(1)(2)(3)(4), (13)(24), (1)(24)(3), (13)(2)(4)\}$

Ans: (a) $\frac{1}{4}(2^4 + 2^2 + 2^3 + 2^3)$, (b) $\frac{1}{4}(5^4 + 5^2 + 5^3 + 5^3)$

2.

$\{(1)(2)(3)(4)(5)(6), (14)(25)(36), (13)(2)(46)(5), (16)(25)(34)\}$

Ans: (a) $\frac{1}{4}(2^6 + 2^3 + 2^4 + 2^3)$, (b) $\frac{1}{4}(5^6 + 5^3 + 5^4 + 5^3)$

3.

$\{(1)(2)(3)(4)(5)(6), (14)(25)(36), (12)(36)(45), (15)(24)(3)(6)\}$

Ans: (a) $\frac{1}{4}(2^6 + 2^3 + 2^3 + 2^4)$, (b) $\frac{1}{4}(5^6 + 5^3 + 5^3 + 5^4)$