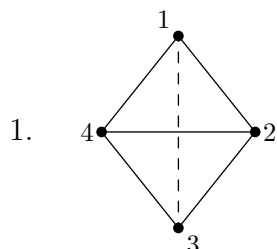


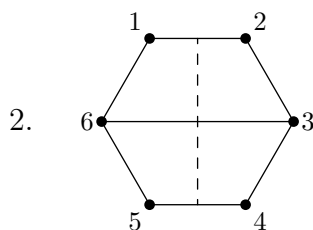
For each of the figures below, **determine the group of rigid motions**. You must express all elements of the group as permutations of the vertex labels, written in **disjoint cycle notation**.



A rhombus (all sides equal)
with a line connecting
2 opposite vertices.

Ans: (a) (i) Identity, 180 rotation, left-right reflection, top-bottom reflection:

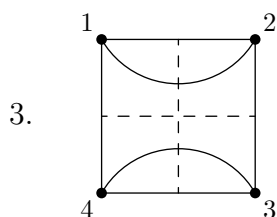
$$\{(1)(2)(3)(4), (13)(24), (1)(24)(3), (13)(2)(4)\}$$



Regular hexagon with a line
connecting 2 opposite vertices.

Ans: Identity, 180 rotation, left-right reflection, top-bottom reflection:

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



Square with 2 identical
symmetrically placed
circular arcs.

Ans: Identity, 180 rotation, left-right reflection, top-bottom reflection:

$$\{(1)(2)(3)(4), (13)(24), (12)(34), (14)(23)\}$$