

3) a) $(13)(24)$ represents a rotation about the vertical line through the apex by 180° .
 $(14)(23)$ is a reflection in the plane through the vertex and the edges between sides 1 and 4, and 2 and 3. 2/2

b) The symmetries of the pyramid are
 e , the identity transformation $(1)(2)(3)(4)(5)$
 $(1234)(5)$, or (1234) rotation about $\pi/2$ anticlockwise
 $(13)(24)(5)$ or $(13)(24)$ rotation about π anticlockwise
 $(1432)(5)$ or (1432) rotation about $3\pi/2$ anticlockwise
 $(1)(24)(3)(5)$, or (24) reflection in plane through vertex and midpoints of sides 2 and 4.

$(14)(23)(5)$ or $(14)(23)$ represents a reflection in the plane through the vertex and the edges between sides 1 and 4, and 2 and 3.

$(12)(34)(5)$ or $(12)(34)$ represents a reflection in the plane through the vertex and the edges between sides 1 and 2, and 3 and 4. 4/4

$(13)(2)(4)(5)$ or (13) represents a reflection in the plane through the vertex and the midpoints of sides 1 and 3.

c) Group the symmetries by geometrical type
 $\{e\}$, $\{e, (1234), (1432)\}$, $\{e, (13)(24)\}$, $\{e, (24)\}$, $\{e, (13)\}$, $\{e, (12)(34)\}$, $\{e, (14)(23)\}$
 These are the conjugacy classes of G . 4/4

d) $\{e, (13)\}$ is a set. Its Cayley table is given by

	e	(13)
e	e	(13)
(13)	(13)	e

SG1 The set is closed under composition

SG2 The identity is a member of the set

SG3 Each member of the set has an inverse

The subgroup has order 2 because it has two elements. It is also generated by (13) which has order 2.