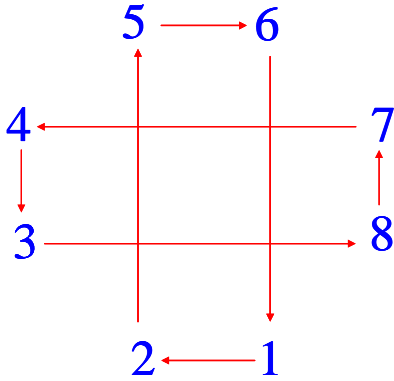


Lesson 12

INTRODUCTION TO ORBITS – ANSWERS

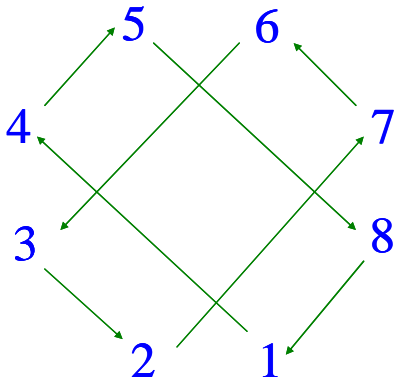
Let $X = \{1, 2, 3, 4, 5, 6, 7, 8\}$, and for each diagram below let G be the group created by the indicated generators. Find all the orbits of G on X .

1. $G = \{ (), (1, 2, 5, 6)(3, 8, 7, 4), (1, 5)(2, 6)(3, 7)(4, 8), (1, 6, 5, 2)(3, 4, 7, 8) \}$



$$\text{Orbits}(G) = \{\{1, 2, 5, 6\}, \{3, 8, 7, 4\}\}$$

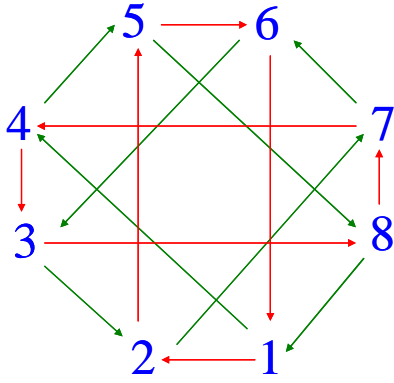
2. $G = \{ (), (1, 4, 5, 8)(2, 7, 6, 3), (1, 5)(2, 6)(3, 7)(4, 8), (1, 8, 5, 4)(2, 3, 6, 7) \}$



$$\text{Orbits}(G) = \{\{1, 4, 5, 8\}, \{2, 7, 6, 3\}\}$$

Lesson 12

3. $G = \{ (), (1,2,5,6)(3,8,7,4), (1,3,5,7)(2,4,6,8), (1,4,5,8)(2,7,6,3), (1,5)(2,6)(3,7)(4,8), (1,6,5,2)(3,4,7,8), (1,7,5,3)(2,8,6,4), (1,8,5,4)(2,3,6,7) \}$



$$\text{Orbits}(G) = \{1, 2, 3, 4, 5, 6, 7, 8\}$$