1. Give the multiplication tables for S_3 and Δ_3.

We know that the Symmtric Group of Degree 3 has $3! = 6$ elements.

Then let us define S_3 on the set Z_3 as follows.

primary_table: { '1,2,3': 'a', '1,3,2': 'b', '2,3,1': 'c', '2,1,3': 'd', '3,1,2': 'e', '3,2,1': 'f' },

a	b	c	d	e	f
b	a	d	c	f	e
c	f	e	b	a	d
d	e	f	a	b	c
e	d	a	f	c	b
f	c	b	e	d	a

Likewise, Δ_3 is the finite set {1, R, R^2,D_1,D_2,D_3}

1 = {1,2,3}

R = {3,1,2}

R^2= {2,3,1}

D_1= {1,3,2}

D_2= {3,2,1}

D_3 = {2,1,3}

1	R	R^2	D_1	D_2	D_3
R	R^2	1	D_3	D_1	D_2
R^2	1	R	D_2	D_3	D_1
D_1	D_2	D_3	1	R	R^2
D_2	D_3	D_1	R^2	1	R
D_3	D_1	D_2	R	R^2	1