Let

$$\alpha = \text{rotation anti-clockwise through } \frac{2\pi}{3} = 120^\circ,$$
$$\beta_1 = \text{reflection about the } Re\,(z) \text{ axis},$$
$$\beta_2 = \text{reflection about the line joining 0 to } e^{\frac{2\pi i}{3}},$$
$$\beta_3 = \text{reflection about the line joining 0 to } e^{\frac{4\pi i}{3}}.$$

Then $D_3 = \{1, \alpha, \alpha^2, \beta_1, \beta_2, \beta_3\}$ and

$$\alpha = (A\,B\,C), \quad \alpha^2 = (A\,C\,B), \quad \beta_1 = (B\,C), \quad \beta_2 = (A\,C), \quad \beta_3 = (A\,B).$$

The multiplication table of D_3 is

	1	α	α^2	β_1	β_2	β_3
1	1	α	α^2	β_1	β_2	β_3
α	α	α^2	1	β_2	β_3	β_1
α^2	α^2	1	α	β_3	β_1	β_2
β_1	β_1	β_3	β_2	1	α^2	α
β_2	β_2	β_1	β_3	α	1	α^2
β_3	β_3	β_2	β_1	α^2	α	1

For example, under $\alpha\beta_1$ we have that $A \mapsto B \mapsto C$, $B \mapsto C \mapsto B$, $C \mapsto A \mapsto A$).

2. Let P_n be a regular n-gon and D_n be its group of symmetries. Then D_n is called the *dihedral group of degree* n and has order $2n$:

$$D_n = \{\underbrace{1, \alpha, \alpha^2, \cdots, \alpha^{n-1}}_{\text{rotations}}, \underbrace{\beta_1, \beta_2, \cdots, \beta_n}_{\text{reflections}}\};$$

where α is a rotation through $\frac{2\pi}{n}$ about the centre of P_n and $\beta_1, \beta_2, \cdots, \beta_n$ are reflections about the axes of symmetry of P_n.

If n is even, then an axis of symmetry either joins two opposite vertices or the mid-points of two opposite sides.

If n is odd, then an axis of symmetry joins a vertex to the mid-point of the opposite side.