Group Reps. HW [1] – [3] Ans.

1. Let g = the permutation
$$\begin{aligned} 0 &\to 1 \\ 1 &\to 2 \\ &\vdots \\ n-1 &\to 0. \end{aligned}$$

This is a commutative group, so, all irred rep's are 1-d.

It suffices to determine L_g, a complex # / mag 1, since all group elements are $g, g^2, g^3, \ldots, g^{n-1}, g^n = id.$

$(L_g)^n = 1$ since $g^n = id.$

So, $L_g = e^{\frac{2\pi i}{n}k}$ for some k.

There are n choices for k, $(k = 0, 1, \ldots, n-1)$.

This leads to n distinct L's, $L^{(0)}, L^{(1)}, \ldots, L^{(n-1)}$

$$L^{(r)}{}_{g^p} = e^{\frac{2\pi i}{n} rp}$$

Each is 1-d $\therefore$ irreducible.

Each is an orthogonal f'n on the group.