Day 13: Cyclic Group, Part I

1. Whiteboard page 1.
2. Whiteboard page 2.
   - We take *powers* of 2, since the operation is multiplication. (**Recall:** Taking successive powers.)
   - Alternatively...
   $$\begin{aligned} U_{13} &= \{\, 1,\ \ 2,\ \ 4,\ \ 8,\ \ 3,\ \ 6,\ 12,\ 11,\ \ 9,\ \ 5,\ \ 10,\ \ \ 7\ \ \} \\ &= \{\, 2^0,\, 2^1,\, 2^2,\, 2^3,\, 2^4,\, 2^5,\, 2^6,\, 2^7,\, 2^8,\, 2^9,\, 2^{10},\, 2^{11}\} \end{aligned}$$
3. Work on Day 13 Class Work. Leave 15 – 20 minutes for discussions.
4. Whiteboard page 3.
   - $g^{-3} = g^{-3} \cdot \varepsilon = g^{-3} \cdot g^{12} = g^9$.
   - $g^{197} = g^{12 \cdot 16 + 5} = (g^{12})^{16} \cdot g^5 = \varepsilon^{16} \cdot g^5 = g^5$.
5. Whiteboard page 4.
   - There's nothing special about 12 here.
6. **Proof of the Day:** Whiteboard page 5.