

Result - If $|G| = n$, then $\langle a^m \rangle \cap \langle a^n \rangle = \langle a^{\gcd(n, \text{lcm}(m, n))} \rangle$

here $|G| = 24 = a^{24}$

$$\begin{aligned} \langle a^{21} \rangle \cap \langle a^{10} \rangle &= \langle a^{\gcd(24, \text{lcm}(21, 10))} \rangle = \langle a^{\gcd(24, 210)} \rangle \\ &= \langle a^6 \rangle \end{aligned}$$