Discussion problem assignment:

第一题：

Assume $x_1(t) = a_1 e^{j\omega_0 t} + a_2 e^{j2\omega_0 t}$ and $x_2(t) = b_1 e^{j\omega_0 t} + b_2 e^{j2\omega_0 t}$ where $T = 2\pi/\omega_0$. Note that $x_1(t)$

and $x_2(t)$ are both composed of harmonic components $\omega_0$ and $2\omega_0$. For signals $y(t) = x_1(t) + x_2(t)$ and

$z(t) = x_1(t)x_2(t)$,

1. prove that $y(t)$ and $z(t)$ are still periodic signals with $T$.
2. Write $y(t)$ and $z(t)$ as linear combination of harmonic components. Explain the difference between $y(t)$ and $z(t)$.

第二题：复数的开方运算

已知复数 $X$ 有 $X^4 = 1$，求 X 的取值。

已知复数 $X$ 有 $X^4 = -1$，求 X 的取值。