1. Given that 2 is a primitive root mod 13, solve the equation
   \[ x^9 \equiv 8 \pmod{13} \]

2. Given that \( 2^{12} = 1 + 3 \cdot 13 \pmod{13^2} \), show that 2 is a primitive root mod 13^2 and find another primitive root mod 13^2 which is \( \equiv 2 \pmod{13} \).