Discrete Mathematics

(a) State the Fermat–Euler theorem, and deduce that \( p \mid (2^p - 2) \) for any prime \( p \).

(b) A composite number \( m \) that satisfies \( m \mid (2^m - 2) \) is known as a pseudo-prime.

Show that \( 2^{10} \equiv 1 \pmod{11} \) and \( 2^{10} \equiv 1 \pmod{31} \). Deduce that 341 is a pseudo-prime.