115 Homework 8

Due MONDAY November 29

Question 1 Draw a table showing why $\phi(7)\phi(3) = \phi(21)$. Indicate what features apply to any pairs of relatively prime integers m and n.

Question 2 (Rosen 6.3.6) Find the last digit (base 10) of $3^{999,999}$.

Question 3 (Rosen 6.3.10) Show that $a^{\phi(b)} + b^{\phi(a)} \equiv 1 \bmod ab$ if $(a, b) = 1$ and $a, b \in \mathbb{N}$.

Question 4 (Rosen 7.1.8) Show $\nexists\ n \in \mathbb{N}$ such that $\phi(n) = 14$.

Question 5 (Rosen 7.1.18) If $m, k \in \mathbb{N}$, show $\phi(m^k) = m^{k-1}\phi(m)$.