

Name: _____ Score (Out of 8 points):

A non-programmable, non-scientific calculator may be used.

1. (a) [2 points] Find all congruence classes x modulo 14 that satisfy the equation

$$4x \equiv 10 \pmod{14}$$

- (b) [3 points] Find all congruence classes x modulo $126 = (14)(9)$ that simultaneously satisfy the following equations:

$$4x \equiv 10 \pmod{14}$$

$$x \equiv 5 \pmod{9}$$

2. [3 points] Suppose that $\gcd(m, n) = d$. Explain why, if a and b are **not** congruent modulo d , the following system of congruences has no solutions.

$$x \equiv a \pmod{m}$$

$$x \equiv b \pmod{n}$$