Name:

Problem 1: *Please solve the following quadratic congruence:*

$$x^2 \equiv 9 \pmod{16}$$

Solution:

Since 9 is a square in the integers, we know a square root: $x \equiv 3 \pmod{16}$ is a solution to this quadratic congruence. By our theorem from class, since $9 \equiv 1 \pmod 8$, there are 4 solutions and they are given by

$$x \equiv 3 \pmod{16}$$
$$x \equiv -3 \equiv 13 \pmod{16}$$
$$x \equiv 3 + 8 \equiv 11 \pmod{16}$$
$$x \equiv -11 \equiv 5 \pmod{16}.$$