

HOMEWORK 7
Math 104 - Dr. Evans
UCSD Winter 2004
Due Thursday, February 26, 5:00pm

1. For the following congruence relations, either find a solution or show that no solution exists.

$$\begin{aligned}x &\equiv 27 \pmod{60} \\x &\equiv 12 \pmod{105}\end{aligned}$$

2. For the following congruence relations, either find a solution or show that no solution exists.

$$\begin{aligned}x &\equiv 40 \pmod{253} \\x &\equiv 50 \pmod{429}\end{aligned}$$

3. For the following congruence relations, either find a solution or show that no solution exists.

$$\begin{aligned}x &\equiv 3 \pmod{11} \\x &\equiv 5 \pmod{12} \\x &\equiv 7 \pmod{13}\end{aligned}$$

4. Prove the identity

$$(z^2 + ab)(ax^2 + by^2 - cz^2 - abc) = a(xz + by)^2 + b(yz - ax)^2 - c(z^2 + ab)^2$$