HW 2 Zp11 08 4

4. List all elements of Z_{21} that have a reciprocal

gcd(21, k) when k = (1, 2, 4, 5, 8, 10, 11, , 13, 16, 17 19, 20)
This list covers all elements of Z_{21} that have a reciprocal

5. a.) Find 2 integers such that $111x + 200y = 1$

$200 = 1 \cdot 111 + 89$
$111 = 1 \cdot 89 + 22$
$89 = 4 \times 22 + 1$
$22 = 22 \times 1 + 0$

$1 = 89 - 4 \times 22$
$1 = 89 - 4 \times (111 - 1 \cdot 89)$
$1 = -4 \cdot 111 + 5 \cdot 89$
$1 = -4 \cdot 111 + 5 \cdot (200 - 1 \times 111)$
$1 = 5 \cdot 200 + [-4 + (5 \cdot -1)] 111$
$1 = 5 \cdot 200 + -9 (111)$
So $x = 5$
$y = -9$