

H2 2PH pg 6

6. cont.

$$x \bmod 5 = 4$$

$$x + 5k = 4$$

$$x = 4 - 5k$$

$$x \bmod 11 = 7$$

$$(4 - 5k) \bmod 11 = 7$$

$$-5k \bmod 11 = 3$$

$$5^{-1}(5k \bmod 11) = 3 \Rightarrow 5^{-1}$$

$$9 \otimes 5 \otimes k \cancel{-1} = 3 \otimes 9$$

$$k = (3 \times 9) \bmod 11$$

$$k = 6$$

$$k = 6 + 11j$$

$$\text{in } \mathbb{Z}_{11}, 5^{-1} = 9$$

$$(9 \times 5) \bmod 11 = 1$$

$$x = 4 - 5k = 4 - 5(6 + 11j) = -26 + (-55j)$$

$$(\forall j \in \mathbb{Z})$$

So the solution set is $\{x \in \mathbb{Z}; x = -26 + (-55j)\}$