Homework due Friday, February 1, 3:00 pm.

(1) Let $a, b$ be two positive integers. Define

$$H = \{am + bn \mid m, n \in \mathbb{Z}\}$$

(a) Show that $H$ is a subgroup of $\mathbb{Z}$ with usual addition.
(b) Show that $H = d\mathbb{Z}$ where $d = \text{g.c.d.}(a, b)$. (Hint: the hard direction is a theorem in Math 109.)

(2) Exercise 4 page 45: 29

(3) Exercise 5 page 55: 11, 12, 13, 33, 41, 48