(1) Exercise 3.20 in text
(2) Exercise 3.24 in text
(3) Let $P_k = \{\text{primes } p \in \mathbb{N} \mid p \equiv k \pmod{3}\}$.
    (a) Give an explicit description of $P_0$.
    (b) Prove that $P_2$ is infinite. (Hint: By way of contradiction, assume that $P_2 = \{p_1, p_2, \ldots, p_n\}$ is finite. Consider the number $3p_1p_2\ldots p_n + 2$.)
    (c) One might hope to similarly prove that $P_1$ is infinite. Explain why the method of proof in part (b) will not work.