I want to give you a break this week to give you a chance to think carefully about the theory in sections 4.1 and 4.2. So this week’s homework is a short one.

The first question is a repeat of one I set last week which had a typo in it – please redo this question just to make sure you understood it. Suppose that \( f(x) \) is a monic polynomial in \( \mathbb{Z}[x] \). Let \( \alpha \in \mathbb{Q} \) be a root of \( f(x) \). Show that \( \alpha \in \mathbb{Z} \). (Hint. Let \( \alpha = \frac{a}{b} \) with \( \text{GCD}(a,b) = 1 \). Let \( f(x) = x^n + a_{n-1}x^{n-1} + \cdots + a_1x + a_0 \). Now substitute \( \alpha \) in for \( x \) and multiply through by \( b^{n-1} \).)

Exercises 4.1 1,2,3,4(b)(c),5,7.