

MATH 252: EXERCISE 9.2.A

**Problem 9.2.A.** Let  $R = \mathbb{F}_3[x]/(x^3 - x - 1)$ .

- (a) Show that  $\#R = 27$ . [*Hint: Use the division algorithm.*]
- (b) Prove that  $R$  is a field.
- (c) Conclude that  $R^\times$  has an element of order 13; in fact, show that  $x$  is such an element.