

MATH 3360 HOMEWORK ASSIGNMENT 12

DUE ON TUESDAY 14 APRIL 2020

- (1) As 101 is a prime, the ring \mathbb{Z}_{101} is a field.
- (a) Find integers a and b such that $1 = 101a + 28b$ holds.
 - (b) Find the multiplicative inverse of 28 in \mathbb{Z}_{101} .
- (Hint: Use the Euclidian algorithm as in 0.3.19)

- (2) (a) Show that the collection C of matrices

$$\begin{pmatrix} x & -y \\ y & x \end{pmatrix} \quad \text{with} \quad (x, y) \in \mathbb{R} \times \mathbb{R}$$

form a subring of the ring of 2×2 -matrices.

- (b) Show that C is a field.

(Hint: Look at Homework Assignment 5)