

## Sommersemester 2025 Homework 5

## 1. QUESTIONS

In this homework, you are going to complete some proofs which were left for exercise in the lecture.

(1) As requested, there is only one question.

- (a) In class, you have seen that every quadratic equation in two variables  $x, y$  has a normal form. You proved this when the coefficient of  $x^2$  or the coefficient of  $y^2$  is nonzero. You left the case when the coefficient of  $x^2$  and  $y^2$  are both zero but the coefficient of  $xy$  is nonzero. Complete this proof.
- (b) Show that the tangent line of  $y^2 = x^3 + k$  at  $(x_0, y_0)$  (here  $y_0 \neq 0$ ) can be described by the equation  $y - y_0 = \frac{3x_0^2}{2y_0}(x - x_0)$ .