

## QUIZ 1

This is a closed-book and closed-notes quiz. You have 20 minutes to solve all the following problems. Write your answers clearly (for example, put the equality symbol where you need it and not just at the end of every line). Calculators are not allowed.

- (1) (5 points) Find an explicit solution to the initial value problem

$$\frac{dy}{dx} - 2x + 1 = 0; \quad y(0) = 2.$$

- (2) (10 points) Determine whether the existence and uniqueness theorem (Theorem 1 in section 1.3) guarantees existence of a solution to the initial value problem

$$\frac{dy}{dx} = \sqrt[3]{y}; \quad y(0) = 0.$$

Find an explicit solution to this initial value problem.

- (3) (5 points) Same as in (2), with initial value problem

$$\frac{dy}{dx} = \sqrt[3]{y-2}; \quad y(0) = 2.$$