

Introduction to Machine Learning Exam

23 June 2026

Immediately write your name and sign each sheet of the exam. Use only a blue or black pen (NO pencil). Write on protocol paper and identify the question with 1, 2, 3 and 4. Use only a professional language, equations when needed (no hand-waving).

Questions (31 points)

1. **Lazy learning.**

Explain the k-Nearest Neighbors method for classification and for regression. (7 points)

2. **Ranking and selecting features.**

Explain the main methods for ranking and selecting features. (7 points)

3. **Linear least-squares.**

Explain the Linear Least-Squares method for fitting experimental data: objectives, definition with equations, optimal solution techniques. (7 points)

4. **Neural Networks: Multi-Layer Perceptrons.**

Explain the Multi-Layer Perceptron (MLP): motivation, objective, architecture (with graphical scheme), equations for training and usage. Explain the gradient of a function. What role does it play when training an MLP? (10 points)