

# Operations Research

## Homework 1

Due on September 13, 2023

**Note:** Your homework must be submitted via moodle (see the link on the class website) on the due day BEFORE THE TUTORIAL, i.e., before 20:45.

### Problem 1 [8 points]

Solve the following LP problem graphically. Minimize

$$Z = 8x_1 + 12x_2$$

subject to

$$5x_1 + 2x_2 \geq 20,$$

$$4x_1 + 3x_2 \geq 24,$$

$$x_2 \geq 2,$$

$$x_1, x_2 \geq 0.$$

### Problem 2 [6 points]

A sum of 12 000\$ is to be invested. At least half the amount will go into an investment earning 6% annual interest, but involving some risk. The amount in the risky investment may not be more than three times the amount in a second, relatively riskless investment earning 5% annual interest. How much should be invested into each in order to maximize interest?

### Problem 3 [6 points] (Exercise 24 from Larson)

Two gasolines, type A and type B, have octane ratings of 80 and 92, respectively. Type A costs 0.83\$ per liter and type B costs 0.98\$ per liter. Determine the blend of minimum cost with an octane rating of at least 90. [Hint: Let  $x_1$  be the fraction of each liter that is type A and  $x_2$  be the fraction that is type B.]