Name:

MATH 108

Spring 2024

HW 19: Due 04/22

Problem 1. (10pts) Consider the function $z = -65x_1 + 5x_2$ on the region $\mathcal{R}$ shown below. Does z have a maximum or minimum value on $\mathcal{R}$? Explain. If the function has a maximum or minimum value on $\mathcal{R}$, find the maximum and minimum value.
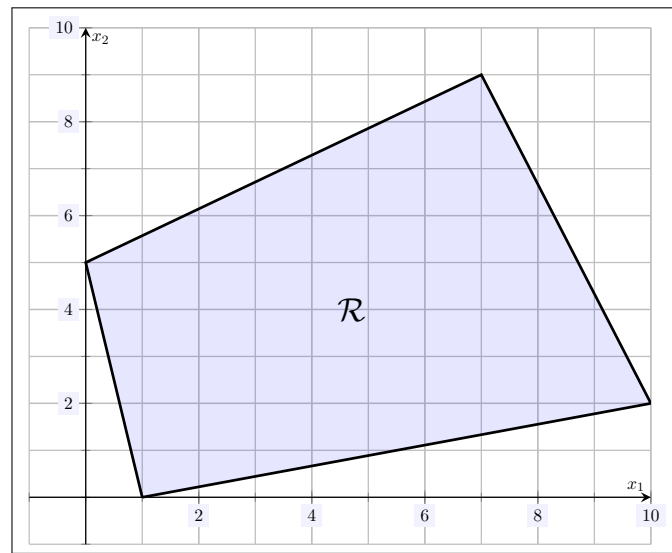
Problem 2. (10pts) Consider the function $z = 6x_1 + 11x_2$ on the region $\mathcal{R}$ shown below. Does z have a maximum or minimum value on $\mathcal{R}$? Explain. If the function has a maximum or minimum value on $\mathcal{R}$, find the maximum and minimum value.
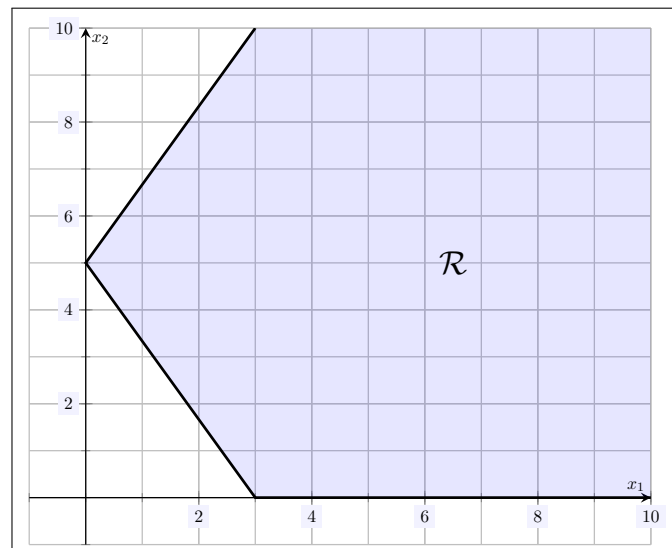
Problem 3. (10pts) Consider the function $z = x_1 + 7x_2$ on the region $\mathcal{R}$ shown below. Does z have a maximum or minimum value on $\mathcal{R}$? Explain. If the function has a maximum or minimum value on $\mathcal{R}$, find the maximum and minimum value.
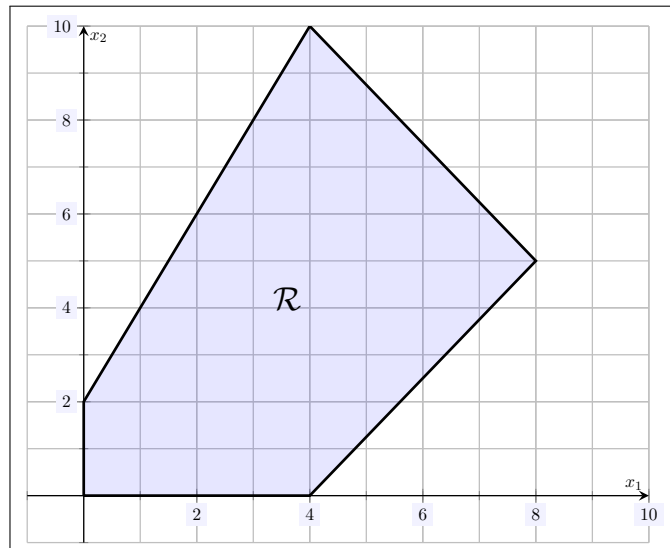
Problem 4. (10pts) Find the dual problem for the minimization problem shown below.

$$\min w = y_1 - y_2 + y_3$$

$$\begin{cases} 2y_1 - y_2 + y_3 \leq 9 \\ y_1 + 5y_2 - y_3 \geq 5 \\ 3y_1 + 4y_2 + 6y_3 \geq 10 \\ -y_1 + y_2 + 8y_3 \leq 5 \\ y_1, y_2, y_3 \geq 0 \end{cases}$$