1 Exercise 1: Part-Time Work

Adem works two part-time jobs, E1 and E2, and wants to limit his total working hours to no more than 12 per week. For each hour worked at E1, he requires 2 hours of preparation, and for each hour worked at E2, he requires 1 hour of preparation. Adem cannot spend more than 16 hours preparing each week. Given that he earns 40 MU per hour at E1 and 30 MU per hour at E2, how many hours should he work at each job to maximize his total income?
MU = Monetary Unit

Solution:

Variables Definition:

Let x_1 be the number of hours worked in E_1.

Let x_2 be the number of hours worked in E_2.

Constraint:

$$\begin{cases} \forall x_1, x_2 \geq 0 \quad \text{(Non-negative work hours)} \\ x_1 + x_2 \leq 12 \quad \text{(Work limit of 12 hours per week)} \\ 2x_1 + x_2 \leq 16 \quad \text{(Preparation time limit of 16 hours)} \end{cases}$$

Objectif Function

$$f(x) = 40x_1 + 30x_2$$

The goal is to maximize Adem's income by maximizing $f(x)$, while adhering to the work and preparation time constraints.