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Course: ISE 754 - Logistics Engineering Term: Fall 2025
Instructor: Leila Hajibabai Due Date: 21^{st} November, 2025

Q1

Solution:

Q2

Solution:

Q5
For our problem we have $L = 1500$ Du, Travel costs of 3 Mu/Du and cargo transportation needs per time unit as shown below:

$$\delta(d) = \begin{cases} 5, & \text{if } 0 \leq d \leq 500 \\ 1, & \text{if } 500 < d < 1000 \\ 5, & \text{if } 1000 \leq d \leq 1500 \end{cases}$$

Solution:

$$CummulativeDemand(d) = CD(d) = \begin{cases} 5d, & \text{if } 0 \leq d \leq 500 \\ 2500 + (d - 500), & \text{if } 500 < d < 1000 \\ 3000 + 5(d - 1000), & \text{if } 1000 \leq d \leq 1500 \end{cases}$$

A. The approach that I will use for this part is solve use the integrals in the formulation to get the answer.

1. For this case, the optimal location is given by:

$$d^* = \frac{\int_a^b CD(x)\mathrm{d}x + CD(a) \cdot a - CD(b) \cdot b}{CD(a) - CD(b)}$$

which is obtained by setting the areas on both sides of the d^* equal to each other. For our particular problem:

$$d^* = \frac{\int_0^{1500} CD(x)\mathrm{d}x + CD(0) \cdot 0 - CD(1500) \cdot 1500}{CD(0) - CD(1500)}$$

$$d^* = \frac{4,125,000 + 0 - 8,250,000}{0 - 5500} = 750$$

$$\boxed{d^* = 750}$$

The best location for the terminal ($n = 1$) is at 750 Du.

2.