

Problem 1

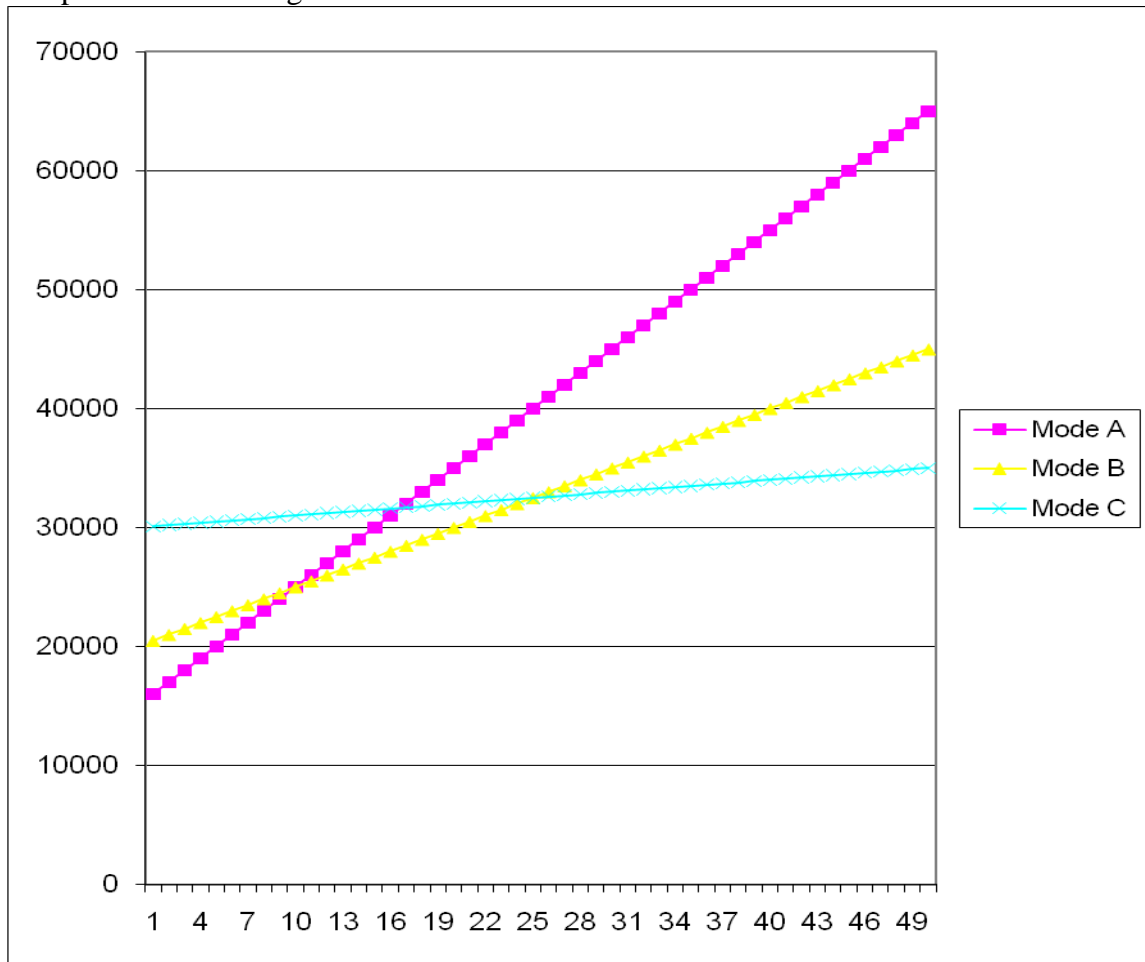
The transportation cost per shipment for three modes of travel are provided below. The number of items in a shipment is represented by v .

Mode A: $\$15,000 + \$1000v$

Mode B: $\$20,000 + \$500v$

Mode C: $\$30,000 + \$100v$

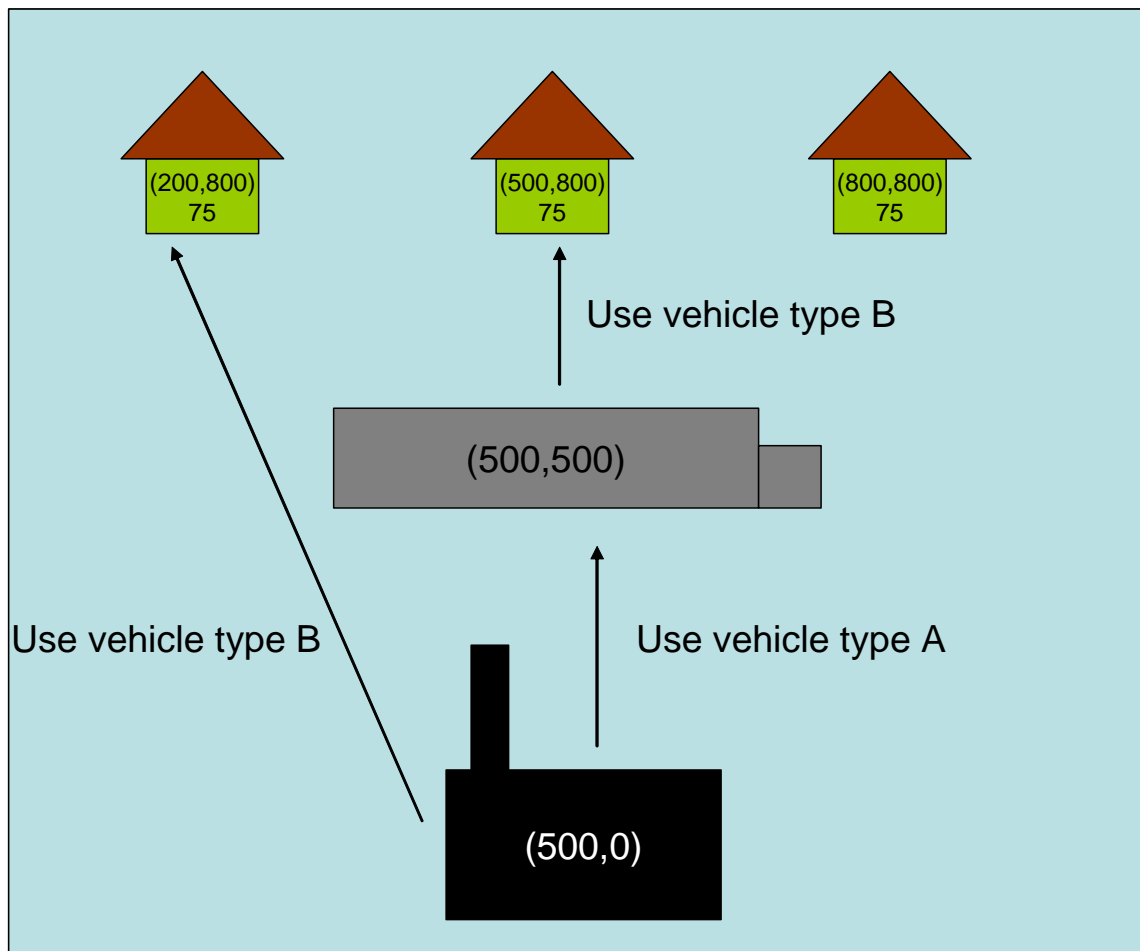
Plot transportation cost against shipment size for shipments of 0 through 50 items and complete the following table:



	Shipment sizes for which this mode is least cost	Per item cost if shipment size is 5	Per item cost if shipment size is 12	Per item cost if shipment size is 25
Mode A	0-10	4000	2250	1600
Mode B	10-25	4500	2167	1300
Mode C	25+	6100	2600	1300

Problem 2

Determine the network structure with smallest logistics cost and complete the table below. Use an L1 metric to calculate distance. Coordinates for each location are given on the figure, as is the demand in number of items per day. Ignore depreciation of the vehicle and insurance, but include the cost of transportation, inventory at the distribution center, and in transit inventory. Assume one trip is made between the factory and the distribution center each day, and one delivery is made to each home each day. Trucks delivering to homes are of type B, however between the factory and the warehouse trucks of type A are used.



Other information:

Fuel economy: 10 miles per gallon
 Driver wages: \$15/hour
 Average vehicle speed: 50 miles per hour
 Price of fuel: \$4.00/gallon
 Value of item: \$2,000
 Capacity of vehicle A: 225 items
 Capacity of vehicle B: 75 items
 Interest rate: 10% per annum
 Time at distribution center: 4 hours

Calculate the daily cost of serving the 3 homes using a direct shipping strategy and a distribution center strategy and complete the table below.

	Transportation cost per day	Inventory Cost	Total Logistics Cost per day of serving 3 homes
Distribution Center	1400	123.2877	1523.288
Direct Shipping	2100	102.7397	2202.74

What are the benefits of using a distribution center, in this case?

Reduce transportation cost.

List 2 other logistical benefits can be derived from the use of a distribution center.

Reduce total inventory holding requirement.

Create market specific products while mass producing.

Decrease per unit handling cost.

Provide a broader range of products.