

Name: KEY

Eagle ID#: _____

ASSIGNMENT 4
TRANSPORTATION COSTING / PRICING ASSIGNMENT
Part 1

Objective:

To show the relationship between distance and transportation costs.

Information:

Using the trucking company information below, fill in the table.

Fixed Cost: Monthly truck payment = \$700

Variable Cost: Driver cost = \$.80 per mile
 Gasoline cost = \$.10 per mile
 Repair cost = \$.10 per mile

Truck Travel Distance (Miles)	Total Variable Cost	Total Fixed Cost	Total Cost	Cost Per Mile
100	\$ 100	\$ 700	\$ 800	\$ 8.00
200	200	700	900	4.50
300	300	700	1,000	3.33
400	400	700	1,100	2.75
500	500	700	1,200	2.40
600	600	700	1,300	2.17

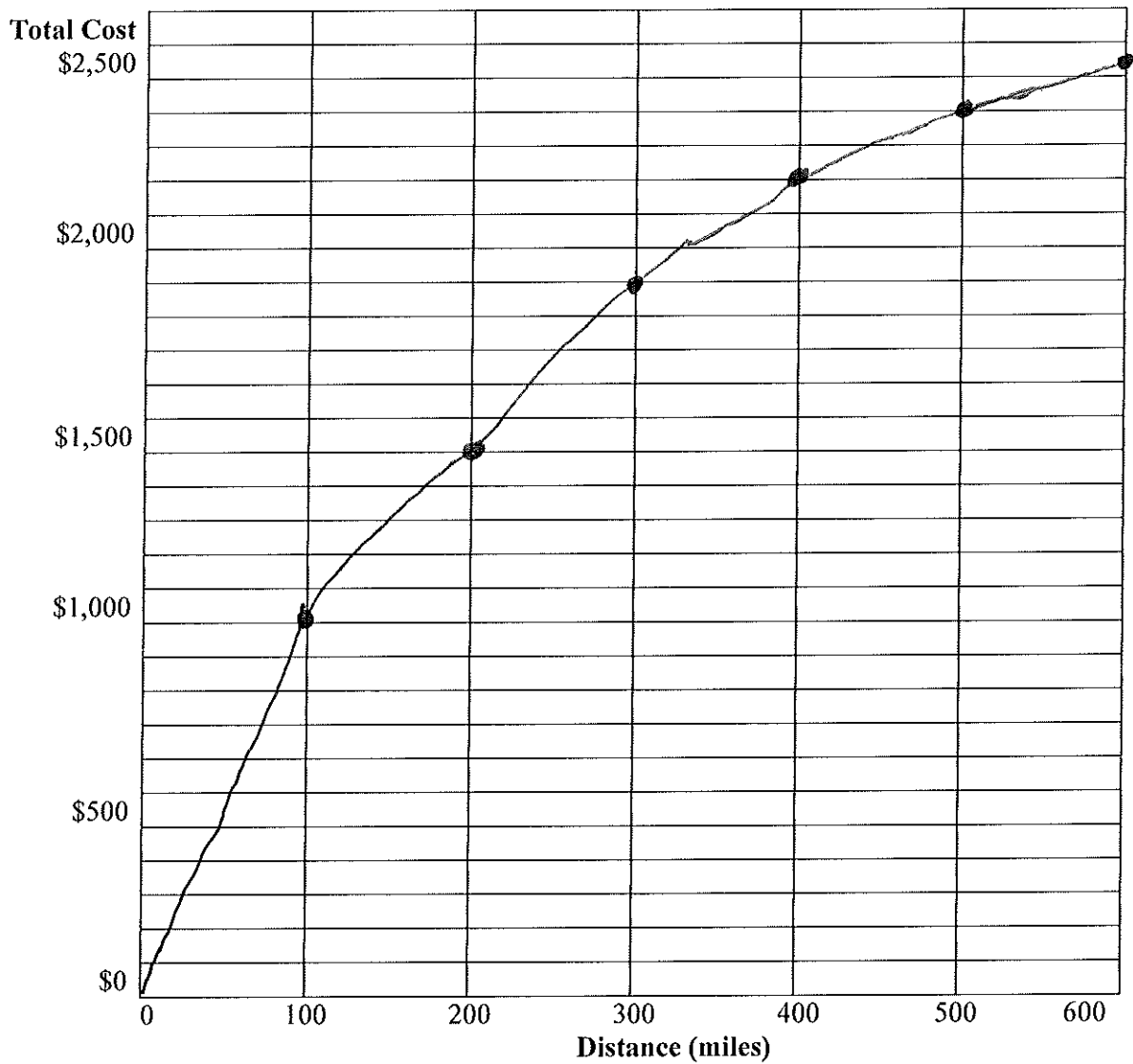
As the truck distance increases, what happens to cost per mile? DECREASES

As a result, the trucking company sets prices in a way that encourages customers to ship products LONGER distances.

Using the following trucking company prices, calculate and then graph (next page) the customers total costs for shipping products 100, 200, 300, 400, 500 and 600 miles.

Miles	Price Per Mile
0-150	\$10.00
151-250	\$ 7.50
251-350	\$ 6.33
351-450	\$ 5.50
451-550	\$ 4.80
551-over	\$ 4.25

Price to Distance Graph



Principle:

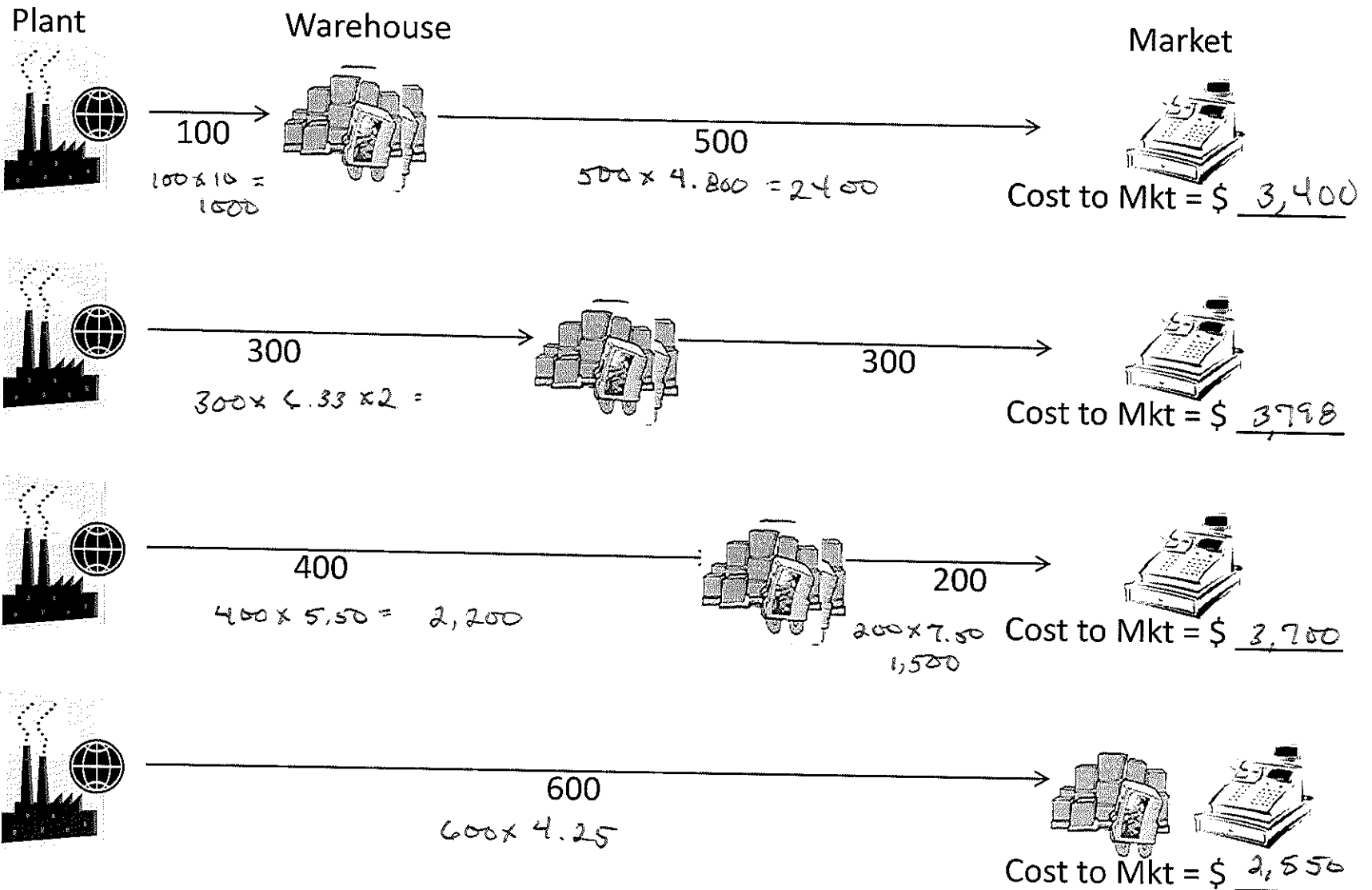
Tapering Principle: As shipment distance increases, total transportation cost INCREASES at a(n) DECREASING rate.

Application:

The customer moves finished goods from the plant to the warehouse and then on to the market. According to the Tapering Principle where should the warehouse be located (see figure next page)? Why? Locate the warehouse at which location?

EITHER END TO MIN TRAN COSTS

Tapering Principle Warehouse Location



**ASSIGNMENT 4
TRANSPORTATION COSTING / PRICING ASSIGNMENT
Part 2**

Objective:

To show the relationship between weight and transportation cost.

Information:

The following table contains UPS truck rates for residential deliveries in Zone 2 (local.)

Weight per Shipment (lbs.)	UPS Rate (total cost)	Cost per Pound
1	\$2.18	\$ 2.18
2	\$2.19	1.10
3	\$2.27	.76
4	\$2.37	.59
5	\$2.46	.49
6	\$2.56	.43
7	\$2.63	.38
8	\$2.72	.34
9	\$2.82	.31
10	\$2.90	.29
15	\$3.25	.21
20	\$3.71	.19
25	\$4.25	.17

Fill in the table and answer the following: A customer orders ten 1lb units from Lands' End catalog. Should Lands' End ship these:

Individually
(10 pkgs of 1 unit each)

Small Groups
(2 pkgs of 5 units each)

Large Group
(1 pkg of 10 units)

\$ Total Costs 21.80 \$ Total PS Costs 4.92 \$ Total UPS Costs 2.90

Principle:

As weight increases, total transportation cost INCREASE at a(n) DECREASE rate and as weight increases, cost per pound DECREASES.

When larger shipments are involved, transportation prices are set for a range of pounds. For example:

0-1,999 lbs = \$8/lb

2,000-3,999 lbs = \$5/lb

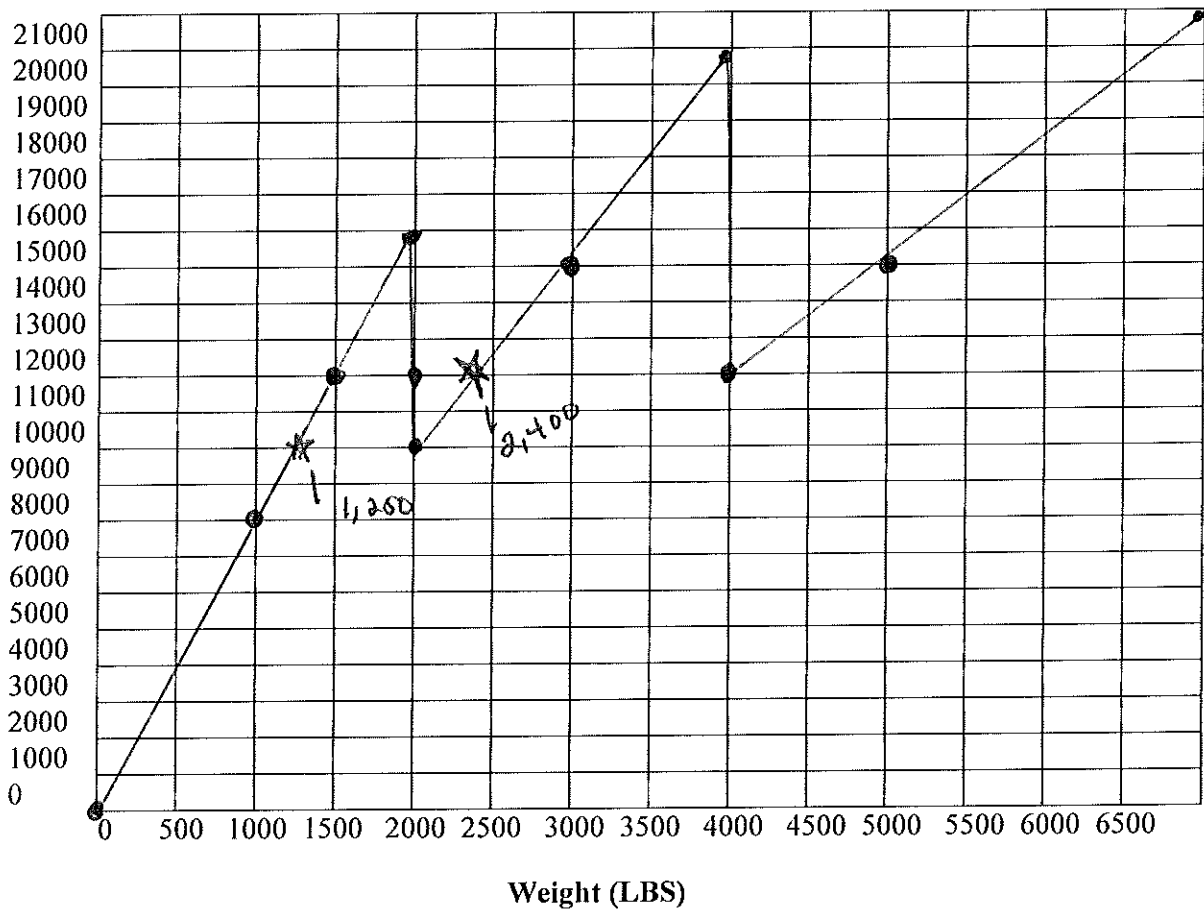
4,000-6,999 = \$3/lb

Fill in the following table using the transportation prices listed above:

LBS	0	1000	1500	1999	2000	3000	3999	4000	5000	6999
Total Cost	0	8,000	12,000	15,992	10,000	15,000	19,995	12,000	15,000	20,997

Develop a line graph using the table above.

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If you have shipments that weight between 2,000-3,999 lbs, at what shipment size (in pounds) is the total cost equal to the cost of shipping 4,000 lbs? > 2,400

Locate this point on the graph and place a star on the graph at this point.

This point is called a **WEIGHT BREAK**. When shipping products, a traffic manager is allowed to use the following weight break rule:

From 2,000 lbs to 2,399 (weight break), pay actual total cost.

From 2,400 (weight break) to 3,999 lbs., ship as 4,000 lbs and pay the total cost for 4,000 lbs {should be lower.}

Beyond 4,000 lbs, pay actual cost until next weight break is reached.

In essence, between 2,000-3,999 lbs, the traffic manager is allowed to cut across the \$12,000 line on the graph from the weight break point to the 4,000 lbs point.

Are there any other weight breaks on the graph? Where? 1,250 lbs.

Place a star at this point, if it exists.

$$\begin{aligned} (4000 \times 3) \\ 12,000 &= 5x \\ x &= \frac{12,000}{5} = 2,400 \text{ lbs} \end{aligned}$$

$$\begin{aligned} (2000 \times 5) \\ 10,000 &= 8x \\ x &= 1,250 \text{ lbs} \end{aligned}$$

ASSIGNMENT 4
TRANSPORTATION COSTING / PRICING ASSIGNMENT
Part 3

Objective:

Explore the relationship between product densities and transportation vehicle utilization.

Information:

A West Coast food company manufactures two products: canned soup in L.A. and boxes of crackers in San Diego. Both products are sold in Northeast U.S. markets. The product characteristics and annual sales for the NE market are provided below:

	NE Sales (cases)	Case Weight (LBS)	Case Cube (Cubic Feet)
Soup	620,000	40	1
Crackers	620,000	12	3

The food company uses a fleet of 48 foot trucks to ship the products to NE markets. Truckload dimensions are as follows:

Net Truckload Capacity	76,800 lbs	3,432 Cu Ft
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Application:

How many TL's of soup must be shipped from LA to NE markets annually? 323

How many TL's of crackers must be shipped from San Diego to NE markets annually? 542

Total Truckloads Annually? 865

Can you reduce the total number of TL Annually? YES NO

If so, how many total TL's would it take annually? 723

see next page for work

* Short answer: combine soup + crackers as much as possible.

	Soup	Crackers	Total	Capacity per truck	Max cases per truck	Pure trucks required
Total to ship	620,000.00	620,000.00				
wt per case	40.00	12.00	76,800.00		1,920.00	soup 322.92
cf per case	1.00	3.00	3,432.00		1,144.00	crackers 541.96
Truckload capacity						864.87
Optimal load	1,752.00	560.00		(used as changing cells in Solver)		
Total cases per optimal load		2,312.00		(used as target cell to minimize in Solver)		
Wt per optimal load	70,080.00	6,720.00	76,800.00			
cf per optimal load	1,752.00	1,680.00	3,432.00			
Number of mixed trucks	353.88					
Number of cases shipped on mixed trucks	620,000.00	198,173.52				
Number of cases remaining	-	421,826.48				
Number of pure trucks required	-	368.73				
Total number of trucks required	722.61					