

Solutions:

1. To have an answer that is within an order of magnitude of the correct answer, or what is termed a zeroth-order approximation.
2. Multiple answers are possible depending on what is the objective. Locating at the two trip per day location minimizes the total distance traveled for the couple while locating one-third of the way between the two and one trip per day locations (the center of gravity) minimizes the weighted distance squared and results in a location that equalizes the travel for the couple.
3. Any two of the following: Transportation may not be the most important factor affecting location. Another criterion may be more important in determining the location; for example, minimizing the maximum distance (minimax). The location may not be feasible (e.g., cannot be located in the middle of a swamp).
4. Adv: Located in more convenient locations compared to when restaurants are owned by competing firms. Disadv: Higher prices.
5. Unless customers are forced to purchase from the facility being located, who actually pays for transport should be whoever can do it at the lowest cost, with transport cost factored into the purchase price.
6. Because it contains both integer variables (the binary variables indicating whether or not a NF is established at the site) and continuous variables (the fraction of EF demand serve from an NF at the site).
7. If the shipment cubes out instead of weighs out.
8. The unit of time over which demand is specified should have no impact on the results, which is only true if the fractional component is used (e.g., it should make no difference if you specify demand annually or weekly, but rounding weekly demand may result in zero demand for most weeks).
9. Adv: Minimizes transport cost. Allows monetary way to be determined independently of distance. Disadv: Increases cycle inventory cost, may not be feasible to store the entire truckload.
10. If there is perfect coordination between inbound and outbound shipment so that all product is crossdocked and none is put into permanent storage.
11. Because the cost of loading/unloading at each terminal, since the number of terminals visited increases with the distance of the shipment.
12. Because equal shipment size results in the same cycle inventory costs IC for both P2P TL and LTL.
13. A rate break is the shipment size at which the tariff rate changes, while a weight break is the point between two rate breaks at which it becomes cheaper to use the next, lower rate.

	dd	mm	ss	x (deg)	x (rad)	dd	mm	ss	y (deg)	y (rad)	d(rad)	d (mi)	
Raleigh	78	39	32	W	-78.66	-1.372857	35	49	19	N	35.82194	0.625211	
14. Rio de Janeiro	43	12	0	W	-43.2	-0.753982	22	57	0	S	-22.95	-0.40055	1.181038 4679.089

.15. S07

	A	B	A&B
Kwt	25	25	25 ton
Kcu	2750	2750	2750 cu ft
s	12	6	7.5 lb/ft ³
d	500	500	500 mi
r	2	2	2 \$/mi
qmax	16.5	8.25	10.3125 ton
f	20	30	50 ton
v	3000	3000	3000 \$/ton
h	0.3	0.3	0.3
a	0.5	0.5	0.5
q*TL	6.6666667	8.1649658	10.3125 ton
TLC*_TL	6000	7348.4692	9489.11
			13348.47 TLC A+B

17. F08

Class	125
MC	95.23 \$
qLB	9000 lb
q	4.5 ton
qB	5 ton
OD(i)	40.69 \$/cwt
OD(i+1)	30.24 \$/cwt
TC_LTL (Czar, no disc)	3024 \$
PPI_LTL	104.2 2004
s	7.49 lb/ft ³
d	532 mi
qLTL	4.5 ton
rLTL	0.907369 \$/ton-mi
TC_LTL	2172.241 \$

16. F08

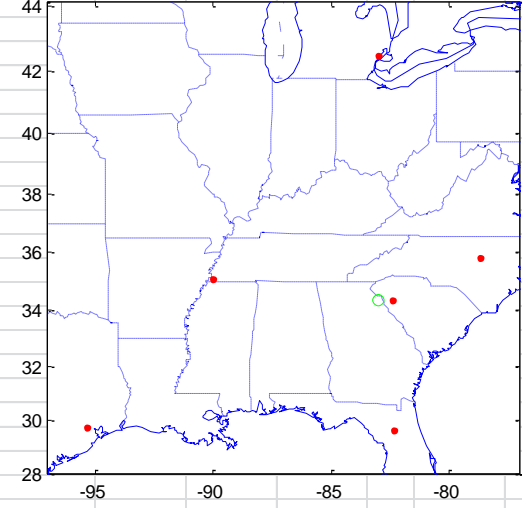
	A	B	A&B	A+B	Pct	f	w=nf
Kwt	25	25	25 ton				
Kcu	2750	2750	2750 cu ft		Asheville	0.15	72 5.018182 5.018182
s	3	30	10.43478 lb/ft ³		Statesville		100 24.24242 29.26061
qmax	4.125	25	14.34783 ton		Winston-Salem	0.2	96 6.690909 35.95152
f	100	380	480 ton		Greensboro		
					Durham	0.3	144 10.03636 45.98788
					Raleigh		380 15.2 61.18788
					Wilmington	0.35	168 11.70909 72.89697
						1	W= 72.89697
							W/2= 36.44848

18.

Common	PPI_TL	111.9	Periodic	f	175 ton
	PPI_LTL	121.4		v	7500 \$/ton
	Kwt	25 ton		h	0.3
	Kcu	2750 ft ³		a	0.5
	s	13 lb/ft ³		q1wk	3.353867
	d	750 mi		TC_TL	85279.19
	r	2.179163 \$/mi		IC_TL	3773.101
	qmax	17.875 ton		TLC1wk_TL	89052.29
	MC_TL	49.03116		TC_LTL	81170.92
	MC_LTL	64.79974		IC_LTL	3773.101
				TLC1wk_LTL	84944.02

								x	y	d	w	TC
Kwt	25 ton		Pct	f	w=n	NF		-83.0167	34.33348			660.85
Kcu	2750 cu ft	Raleigh	0.15	225	12	1		-78.65	35.81667	5.849858	12	70.1983
s	20 lb/ft3	Houston	0.3	450	18	2		-95.3833	29.76667	16.93348	18	304.8026
qmax	25 ton	Memphis	0.25	375	15	3		-90	35.1	7.749858	15	116.2479
f	1500 ton											
f_lb	3000000 lb	Due West	0.1	150	12	5		-82.3833	34.33333	0.633475	12	7.601704
ft^3	150000 ft^3	Warren	0.15	225	12	6		-83.0167	42.48333	8.149858	12	97.7983
		Gainesville	0.05	75	12	7		-82.3333	29.66667	5.350142	12	64.2017
			1									
				W=								
				W/2=								

xy is 4.60 mi SE of Bowersville, GA



19.