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 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 a 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 independent of distance. Disadv: Increases cycle inventory cost, may not be feasible to store 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 is 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		
Rio de Janeiro	43	12	0 W	-43.2	-0.753982	22	57	0 S	-22.95	-0.40055	1.181038	4679.089

14.

15.

Kwt	24	ton
Kcu	3000	ft^3
s	10	lb/ft^3
d	750	mi
r	2	$/mi
qmax	15	ton
f	200	ton
n	13.33333	
t	0.075	yr
t_days	18.75	days
rFTL	0.133333	
MC_TL	45	
TC_FTL	20000	$/ton
v	5000	
h	0.2	
a	1	
IC_FTL	15000	
TLC_FTL	35000	ton
q2wk	7.665982	
TC_TL	39133.93	
IC_TL	7665.982	
TLC*_TL	46799.91	
Incr TLC	11799.91	

16. S07

	A	B	A&B	
Kwt	25	25	25	ton
Kcu	2750	2750	2750	cu ft
s	12	6	7.5	lb/ft3
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

18. F08
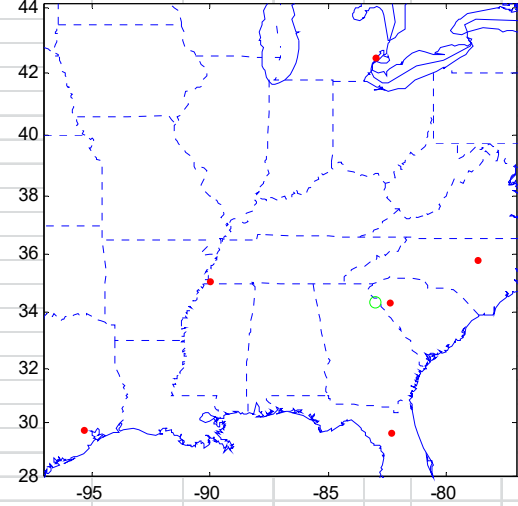
Class	125	
MC	95.23	$
qLB	9000	lb
q	4.5	ton
qB	5	ton
OD(i)	40.69	$/cwt
OD(i+1)	30.24	$/cwt
TC_LTL (Czar, no disc)	3024	$
PPI_LTL	104.2	2004
s	7.49	lb/ft^3
d	532	mi
qLTL	4.5	ton
rLTL	0.907369	$/ton-mi
TC_LTL	2172.241	$

17. F08

	A	B	A&B	A+B	
Kwt	25	25	25		ton
Kcu	2750	2750	2750		cu ft
s	3	30	10.43478		lb/ft3
qmax	4.125	25	14.34783		ton
f	100	380	480		ton

		Pct	f	w=nf	
Asheville		0.15	72	5.018182	5.018182
Statesville			100	24.24242	29.26061
Winston-Salem		0.2	96	6.690909	35.95152
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

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	
					IC_TL	3773.101	
	r	2.179163	$/mi		TLC1wk_TL	89052.29	
	qmax	17.875	ton		TC_LTL	81170.92	
	MC_TL	49.03116			IC_LTL	3773.101	
	MC_LTL	64.79974		`	TLC1wk_LTL	84944.02	

19.

5

					Pct	f	w=n	NF	x	y	d	w	TC
Kwt	25	ton							-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=	81						
						W/2=	40.5						

xy is 4.60 mi SE of Bowersville, GA

20.