HW Problem 1: **SOLUTION** **2004**

The Town of Dusseau's Folly has 95,000 inhabitants. It is served by the Orlins landfill, which receives all of the town's municipal waste. Mehta Consulting has completed a waste quantity study. Four times, once during Fall, Winter, Spring and Summer, Mehta employees weighed all the trucks arriving at the landfill from Dusseau's Folly for a one week period. The landfill is open for a half day on Saturday, closed on Sunday.

a. For the data shown below, for the first day of the Summer waste quantity study, determine both the arithmetic mean and the unbiased mean of weight per truck.

Day 1

Hour	Total Truck	Trucks Sample	Truck weights (tons) Xij				
i	mi	ni	1	2	3	4	j 5
1	4	4	8	10	9	9	
2	7	5	8	7	9	10	6
3	8	5	10	9	7	7	8
4	10	5	9	10	9	10	10
5	8	5	7	6	5	8	6
6	4	4	6	6	8	6	
7	6	5	6	6	5	4	5
8	3	3	5	6	5		

Arithmetic mean = Sum(Xij) / Sum(ni) = 7.4 tons/truck

unbiased mean = Sum(mi (Sum(Xij) / ni)) / Sum mi
= 7.6 tons/truck

b. The Table below contains data for the other 6 days of the summer waste quantity study. Using information below and from part a, determine the total number of trucks arriving at the landfill and the average weight per truck during the summer waste quantity study.

Day 2		Day 3		Day 4		Day 5		Day 6	
Total Trucks	unbiased Average Weight	Total Trucks	unbiased Average Weight	Total Trucks	unbiased Average Weight	Total Trucks	unbiased Average Weight	Total Trucks	unbiased Average Weight
47	7.1	52	7.2	50	7.3	46	7	21	4

From part a,

Total Trucks during day 1 = 50 trucks
unbiased Average Weight during day 1 = 7.6 tons/truck

Over the Seven day period

Total number of Trucks arriving = Sum(TT) = 266 trucks
unbiased average weight = Sum(TT x BAW) / Sum(TT) = 7.0 tons/truck
where TT = total trucks each day, and BAW = unbiased average weight each day

c. The Table below contains data for the other 3 week long waste quantity studies.
Using information below and from part b, estimate the total number of trucks arriving at the landfill and the total amount of waste received during a typical year. Assume that the results from each week long study represent activity at the landfill during one quarter of a typical year

Fall		Winter		Spring	
Total Trucks	unbiased Average Weight	Total Trucks	unbiased Average Weight	Total Trucks	unbiased Average Weight
281	7.1	230	6.7	278	7

From part b,

Total Trucks during summer study = 266 trucks
unbiased Average Weight = 7.0 tons/truck

Over a year

Total number of trucks at landfill = Sum(total trucks during each study) x 13 = 13715 trucks
Estimated amnt. waste received = 13* sum est. waste during each study = 95410 tons

d. Using your answer to part c, determine the pounds of waste collected per person per day in Dusseau's Folly.

Per person / day as collected = est. total waste received in year / number of people / days in year
= 5.5 lbs/person/day