EVE 290
Introduction to Environmental Engineering

Homework #2

1. A laboratory's measurement process was assessed by randomly inserting 27 specimens having a know concentration of $\mu = 8.0$ mg/L into the normal flow of work over a period of 2 weeks. A large number of measurements were being done routinely and any of several chemists might be assigned any sample specimen. The chemists were "blind" to the fact that performance was being assessed. The "blind specimens" were outwardly identical to all other specimens passing through the laboratory. This arrangement means that observed values are random and independent. The results were (in mg/L, from left to right):

6.9	7.8	8.9	5.2	7.7	9.6	8.7	6.7	4.8
8.0	10.1	8.5	6.5	9.2	7.4	6.3	5.6	7.3
8.3	7.2	7.5	6.1	9.4	5.4	7.6	8.1	7.9

(a) Determine the mean, median, and standard deviation of the 27 samples.
(b) Construct a histogram and comment on its shape.
(c) Construct a cumulative distribution function.

2. The hydrocarbon emissions at idling speed in parts per million (ppm) for Honda Civics manufactured in 2000 and 2010 are show below for 40 randomly selected cars.

2000

141	359	247	940	882	494	306	210	105	880
200	223	188	940	241	190	300	435	241	380

2010

140	160	20	20	223	60	20	95	360	70
220	400	217	58	235	380	200	175	85	65

Do the data suggest that hydrocarbon emissions improved from 2000 to 2010? Why (not)?