Probability and Statistics. Week 1

1. (Walpole 1.2) The reaction time, in milliseconds, of 20 amateur racers is measured. A sample is as follows:

187.1	214.1	207.2	218.1	192.9	224.3	201.7
237.1	194.4	205.0	189.2	203.3	230.0	228.5
192.5	217.7	221.1	197.7	180.4	211.2	

   (a) Calculate the sample mean and sample median for the above sample values.
   (b) Compute the 10% trimmed mean.
   (c) Do a dot plot of the absorbency data.
   (d) Using only the values of the mean, median, and trimmed mean, do you have evidence of outliers in the data?

2. (Walpole 1.5 and 1.11) The effect of regular exercising on a cholesterol level is being evaluated. All participants are divided into two equal groups. Changes in cholesterol levels reported below.

Control group:	7	3	-4	14	2
	5	22	-7	9	5
Treatment group:	-6	5	9	4	4
	12	37	5	3	3

   (a) Do a dot plot of the data for both groups on the same graph.
   (b) Compute the mean, median, and 10% trimmed mean for both groups.
   (c) Explain why the difference in means suggests one conclusion about the effect of the regimen, while the difference in medians or trimmed means suggests a different conclusion.
   (d) Compute the sample variance and the sample standard deviation for both groups.

3. (Walpole 1.13) A manufacturer of electronic components is interested in determining the lifetime of a certain type of battery. A sample, in hours of life, is as follows:

$$123, 116, 122, 110, 175, 126, 125, 111, 118, 117$$

   (a) Find the sample mean and median.
   (b) What feature in this data set is responsible for the substantial difference between the two? Recalculate the mean without that feature and compare the results.

4. (Walpole 1.17) A study of the effects of smoking on sleep patterns is conducted. The measure observed is the time, in munutes, that it takes to fall asleep. These data are obtained:

Smokers (A):	69.3	56.0	22.1	47.6
	53.2	48.1	52.7	34.4
	60.2	43.8	23.2	13.8
Nonsmokers (B):	28.6	25.1	26.4	34.9
	29.8	28.4	38.5	30.2
	30.6	31.8	41.6	21.1
	36.0	37.9	13.9	

(a) Find the sample mean for each group.

(b) Find the sample standard deviation for each group.

(c) Make a dot plot of the data sets A and B on the same line.

(d) Comment on what kind of impact smoking appears to have on the time required to fall asleep.

5. (Walpole 1.18) The following scores represent the final examination grades for an elementary statistics course:

23	60	79	32	57	74	52	70	82
36	80	77	81	95	41	65	92	85
55	76	52	10	64	75	78	25	80
98	81	67	41	71	83	54	64	72
88	62	74	43	60	78	89	76	84
48	84	90	15	79	34	67	17	82
69	74	63	80	85	61			

(b) Construct a relative frequency histogram, draw an estimate of the graph of the distribution, and discuss the skewness of the distribution.

(c) Compute the sample mean, sample median, and sample standard deviation.

6. (Walpole 1.20) The following data represents the length of life, in seconds, of 50 fruit flies subject to a new spray in a controlled laboratory experiment:

17	20	10	9	23	13	12	19	18	24
12	14	6	9	13	6	7	10	13	7
16	18	8	13	3	32	9	7	10	11
13	7	18	7	10	4	27	19	16	8
7	10	5	14	15	10	9	6	7	15

(b) Set up a relative frequency distribution.

(c) Construct a relative frequency histogram.

(d) Find the median.