Chapter 3, Problems 3, 23, 24

3.3 Exercise 3

Manually calculate the mean, standard deviation, variance, and median of the following four data sets. Comment on the results.

a. 100 100 100 100 100
b. 50 75 100 125 150
c. 50 100 100 100 150
d. 75 75 75 100 175

x	(x - x-bar)	(x- x-bar)^2
100	0	0
100	0	0
100	0	0
100	0	0
100	0	0

x-bar = 100
s = 0
s^2 = 0
median = 100

x	(x - x-bar)	(x- x-bar)^2
50	-50	2500
75	-25	625
100	0	0
125	25	625
150	50	2500

x-bar = 100
s = 39.53
s^2 = 1562.5
median = 100

$$s = \left[\frac{(50-100)^2 + \dots}{5-1}\right]^{1/2} = 39.53$$

x	(x - x-bar)	(x- x-bar)^2
50	-50	2500
100	0	0
100	0	0
100	0	0
150	50	2500

x-bar = 100
s = 35.35
s^2 = 1250
median = 100

$$s = \left[\frac{(50-100)^2 + \dots}{5-1}\right]^{1/2} = 35.35$$

2		x-xbar	(x-xbar)^
	75	-25	625
	75	-25	625
	75	-25	625
	100	0	0
	175	75	5625
			7500
xbar	100		
s	43.3		
var	1875		
median	75		

$(x-$ $)^2$

7500

$$s = \qquad = \qquad = 43.3$$
$$n-1 \qquad 5-1$$

3.23 Exercise 23

For the data set shown in exercise 10.17 determine the overall sample mean and standard deviation. Determine also the sample mean and standard deviation for each of the machines (See Example 19.12 for a compiling of the data by machine). Comment on results.

Exercise 10.17. The output of a process is produced by two machines. Create a 30,000-Foot-Level response for the overall output of this process, which does not consider the effect of machine.

Response	Machine
109.40	Machine A
83.03	Machine A
120.75	Machine B
89.20	Machine A
121.26	Machine A
121.47	Machine B
85.77	Machine A
84.22	Machine A
111.30	Machine B
99.70	Machine A
135.74	Machine A
151.01	Machine B
135.18	Machine A
130.88	Machine A
108.80	Machine B
120.56	Machine A
126.12	Machine A
119.45	Machine B
84.65	Machine A
102.22	Machine A
135.68	Machine B
98.47	Machine A
116.39	Machine A
118.55	Machine B
103.39	Machine A
89.52	Machine A
101.22	Machine B
107.78	Machine A
119.43	Machine A
78.53	Machine A
84.47	Machine A
106.84	Machine A

	Description	Results
1	Overall machine mean and standard deviation	109.41 and 18.54
2	Machine A mean and standard deviation	104.90 and 18.14
3	Machine B mean and standard deviation	120.91 and 14.83
4	Comments	Looks like there could be a difference in the mean value. Also, might be a difference between standard deviation; however, the sample size might not be large enough to claim a statistical significant difference

3.24 Exercise 24

Consider that an airplane's departure time is classified late if its entry door is not closed within 15 minutes of its scheduled departure time. Discuss whether this type of airline data is attribute/discrete or continuous/variables data and what might be done differently to better describe departure time of flights relative to customer expectations.

Currently data is reported as discrete, i.e., the plane left on time or not. A better assessment could be made using continuous data, where the difference between actual and scheduled departure time is reported, i.e. how many minutes the flight departed late.