Solution of Homework 4
Term 123

Chapter 6

6-14. Sample average:

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n} = \frac{19.57}{9} = 2.174 \text{ mm}$$

Sample variance:

$$\sum_{i=1}^{9} x_i = 19.57$$

$$\sum_{i=1}^{9} x_i^2 = 45.958$$

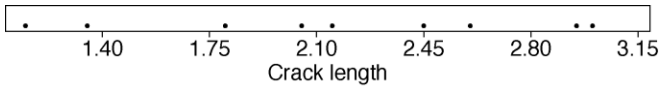
$$s^2 = \frac{\sum_{i=1}^{n} x_i^2 - \frac{\left(\sum_{i=1}^{n} x_i\right)^2}{n}}{n-1} = \frac{45.958 - \frac{(19.57)^2}{9}}{9-1} = \frac{3.404}{8}$$

$$= 0.4255 \text{ (mm)}^2$$

Sample standard deviation:

$$s = \sqrt{0.4255} = 0.6523 \text{ mm}$$

Dot Diagram



6-37. Stem-and-leaf display for Problem 6-37. Height: unit = 0.10 1|2 represents 1.2

Female Students		Male Students
0	154	1
00	157	3
00	160	5
0000	162	9
00000000	165	17
0000	167	(4)
00000000	170	16
00000	172	8

2	165	00
3	167	0
7	170	0000
17	172	0000000000

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 00|175   3    (15)  175|000000000000000
0|177   1     18    177|0000000
              11    180|00000
              6     182|00
              4     185|00
                2     187|0
              1     190|0
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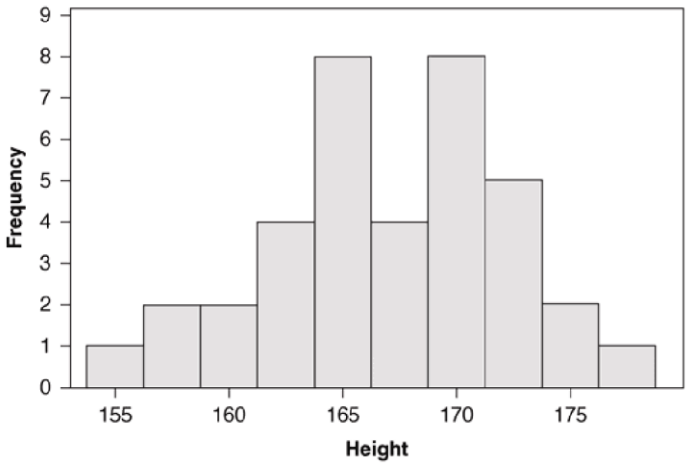
The male engineering students are taller than the female engineering students. Also there is a slightly wider range in the heights of the male students.

6-46.

Frequency Tabulation for Problem 6-30. Height Data

	Lower Limit	Upper Limit	Midpoint	Frequency	Cumulative Frequency	Relative Frequency	Cum. Rel. Frequency
1	153.75	156.25	155.0	1	1	0.027027	0.02703
2	156.25	158.75	157.5	2	3	0.054054	0.08108
3	158.75	161.25	160.0	2	5	0.054054	0.13514
4	161.25	163.75	162.5	4	9	0.108108	0.24324
5	163.75	166.25	165.0	8	17	0.216216	0.45946
6	166.25	168.75	167.5	4	21	0.108108	0.56757
7	168.75	171.25	170.0	8	29	0.216216	0.78378
8	171.25	173.75	172.5	5	34	0.135135	0.91892
9	173.75	176.25	175.0	2	36	0.054054	0.97297
10	176.25	178.75	177.5	1	37	0.027027	1.00000

Mean = 166.78 Standard Deviation = 5.329 Median = 167.5



6-55. Descriptive Statistics

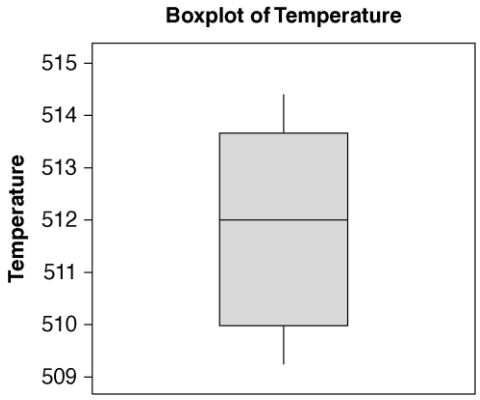
Variable	N	Mean	Median	Tr Mean	StDev	SE Mean
Temperat	9	511.91	512	511.91	4.33	1.44

Variable	Min	Max	Q1	Q3
Temperat	509	515	509.95	513.65

a) Sample Mean: 511.91
Sample Variance: 9.53
Sample Standard Deviation: 4.33

b) Median: 512: Any increase in the largest temperature measurement will not affect the median.

c)



Chapter 7

7-5. $\mu_{\bar{X}} = 520 kN/m^2;\ \sigma_{\bar{X}} = \frac{\sigma}{\sqrt{n}} = \frac{25}{\sqrt{6}} = 10.206$

$$P(\bar{X} \geq 525) = P\left(\frac{\bar{X}-\mu}{\sigma/\sqrt{n}} \geq \frac{525-520}{10.206}\right)$$

$$= P(Z \geq 0.4899) = 1 - P(Z \leq 0.4899)$$

$$= 1 - 0.6879 = 0.3121$$

7-11. $n = 36$

$$\mu_X = \frac{a+b}{2} = \frac{(3+1)}{2} = 2$$

$$\sigma_X = \sqrt{\frac{(b-a+1)^2-1}{12}} = \sqrt{\frac{(3-1+1)^2-1}{12}} = \sqrt{\frac{8}{12}} = \sqrt{\frac{2}{3}}$$

$$\mu_{\bar{X}} = 2, \sigma_{\bar{X}} = \frac{\sqrt{2/3}}{\sqrt{36}} = \frac{\sqrt{2/3}}{6}$$

$$z = \frac{\bar{X}-\mu}{\sigma/\sqrt{n}}$$

Using the central limit theorem:

$$P(2.1 < \bar{X} < 2.5) = P\left(\frac{\frac{2.1-2}{\sqrt{2/3}}}{6} < Z < \frac{\frac{2.5-2}{\sqrt{2/3}}}{6}\right)$$

$$= P(0.7348 < Z < 3.6742)$$

$$= P(Z < 3.6742) - P(Z < 0.7348)$$

$$= 1 - 0.7688 = 0.2312$$