1.10 a)

Stem (tens)	Leaf (ones and tenths)
2	7.1
3	9.8 0.0 6.7 1.7 5.5 9.1 3.8 7.0
4	8.0 7.3 0.0 7.2 4.6 5.9 2.3 9.5
5	8.2 2.6 6.3 6.0 5.8 9.1
6	5.0 1.8 5.2 8.2 2.3 1.2 1.5 0.6 9.0 5.8 0.9 0.7 9.3 9.8 4.9 6.3
7	8.8 1.4 5.3 1.7 4.5 6.0 7.1
8	3.2 7.1
9	4.6 1.3

b) Intervals cannot overlap.

c)

Class Interval	Frequency	Relative Freq.
20-<30	1	.02
30-<40	8	.16
40-<50	8	.16
50-<60	6	.12
60-<70	16	.32
70-<80	7	.14
80-<90	2	.04
90-<100	2	.04

d) 34% were less than 50, 54% were at least 60

1.24

Class Interval	Cumulative Frequency	Cumulative Relative Freq.
20-<30	1	0.02
30-<40	9	0.18
40-<50	17	0.34
50-<60	23	0.46
60-<70	39	0.78
70-<80	46	0.92
80-<90	48	0.96
90-<100	50	1.00

1.28 a) $\bar{x} = \frac{1}{n}\sum x_i = 103.1$

b) $\bar{x}_{tr(10)} = 102.9$

1.31 a) $\bar{x} = 1.0297$
$\tilde{x} = \frac{1}{2}(x_8 + x_9) = 1.009$

b) You can decrease the max number so long as the decreased number is not less than $x_9 = 1.011$, so it can be decreased by $1.394 - 1.011 = 0.383$

1.32 $\tilde{x} = \frac{60.7+60.9}{2} = 60.8$
$\bar{x} = 58.54$

$\bar{x}_{tr(25)} = \frac{\bar{x}_{tr(24)} + \bar{x}_{tr(26)}}{2} = 59.25$
$\bar{x}_{tr(10)} = 58.3475$

1.34 a) $\bar{y} = \frac{\sum y_i}{n} = \frac{\sum (x_i + c)}{n} = \frac{\sum y_i}{n} + \frac{nc}{n} = \bar{x} + c$
$\tilde{y}$ =the median of $(x_i + c, x_2 + c, \ldots, x_n + c)$ = median of $(x_1, x_2, \ldots, x_n) +$ $c = \tilde{x} + c$

b) $\bar{y} = \frac{\sum y_i}{n} = \frac{\sum (cx_i)}{n} = \frac{c \sum y_i}{n} = c\bar{x}$
$\tilde{y}$ =the median of $(cx_1, cx_2, \ldots, cx_n) = c$ times median of $(x_1, x_2, \ldots, x_n) =$ $c\tilde{x}$

1.36 a) range $= 49.3 - 23.5 = 25.8$
mean $\bar{x} = 31.05$

b) $s^2 = \frac{\sum_{i=1}^{n} (x_j - \bar{x})^2}{n-1} = 49.3112$

c) $s = \sqrt{s^2} = 7.0222$

d) $s^2 = \frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n-1} = 49.3112$

1.38 $\bar{x} = 6.133$
$s^2 = .095$

1.50 For Problem 36, $c.v. = \frac{s}{\bar{x}} = .2263$
For Problem 38, $c.v. = \frac{s}{\bar{x}} = .0502$
The data in Problem 36 has higher relative variation.

1.63 a) Since the constant $\bar{x}$ is subtracted from each x_i to obtain y_i, and addition or subtraction of a constant does not affect variability, $s_y^2 = s_x^2$ and $s_y = s_x$.

b) let $c = \frac{1}{s}$ where s is the sample s.d. of the x_j's and also (by a) the y_j's. Then $s_z = cs_y = \frac{1}{s}s = 1$, and $s_z^2 = 1$.