Solution I

Question 1

a) The stem-and-leaf display of the scores is

9	58
10	6
11	559
12	6
13	135678
14	344557
15	2478
16	01222567
17	14688
18	24
19	04

b) The sample mean is $= \ 6005/40 = 150.125$

c) Median $= \ (152 \ + 154) \ / \ 2 \ = \ 153$

d) 40/ 4 = 10, so we need to count in 10 observations. The 11^{th} smallest observation also satisfies the definition. This yields $Q_1 = \frac{135+167}{2} = 135.5$

Using a similar approach, we find that $Q_3 = \frac{166+167}{2} = 166.5$

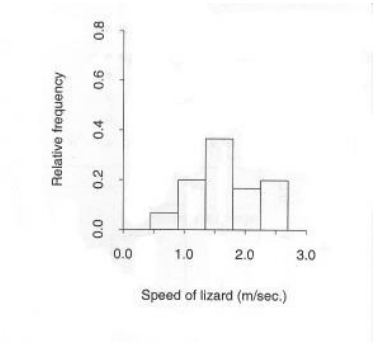
e) Interquartile range $= \ Q_1 \ - Q_3 \ = \ 166.5 \ - 135.5 \ = \ 31.0$ points

Question 2

a) In the following frequency distribution of lizard speed (in meters per second), the left endpoint is included in the class interval but not the right endpoint.

Class Interval	Frequency	Relative Frequency
0.45 to 0.90	2	0.067
0.90 to 1.35	6	0.200
1.35 to 1.80	11	0.367
1.80 to 2.25	5	0.167
2.25 to 2.70	6	0.200
Total	30	1.001(rounding error)

b) All of the class intervals are of length 0.45 so we can graph rectangles whose heights are the relative frequency. The histogram is



c) The ordered data are

0.50 0.76 1.02 1.04 1.20 1.24 1.28 1.29 1.36 1.49
1.55 1.56 1.57 1.57 1.63 1.70 1.72 1.78 1.78 1.92
1.94 2.10 2.11 2.17 2.47 2.52 2.54 2.57 2.66 2.67

Since the number of observations is 30, the median or second quartile is the average of the 15th and 16th in the list. Sample median $= (1.63 + 1.70) / 2 = 1.665$ meters per second. Because $30 / 4 = 7.5$, the first quartile is the 8th ordered observation, and because $(0.75)(30) = 22.5$, the third quartile is the 23rd ordered observation:

$$Q_1 = 1.29 \quad Q_2 = 1.665 \quad Q_3 = 2.11$$

d) Since $0.9(30) = 27$, the 90th percentile is the average of the 27th and 28th observation in the ordered list. Sample 90th percentile $= (2.54 + 2.57) / 2 = 2.555$.

Question 3

a. $\bar{x} = 6.78$ and $s = \sqrt{19.4096} = 4.406$

b. Sample median = (6 + 7) / 2 = 6.5 . Both the sample mean and the sample median give a good indication of the amount of mineral lost.

c.

	$\bar{x} \pm s$	$\bar{x} \pm 2s$	$\bar{x} \pm 3s$
Interval:	(2.369, 11.181)	(2.037, 15.587)	(-6.443, 19.993)
Proportion:	26/40 =0.65	38/ 40 =0.95	40/40 =1.00
Guidelines:	0.68	0.95	0.997

d. We observe a good agreement with the proportions suggested by the empirical guideline.