36.

a. A stem-and leaf display of this data appears below:

32	55	stem: ones
33	49	leaf: tenths
34		
35	6699	
36	34469	
37	03345	
38	9	
39	2347	
40	23	
41		
42	4	

The display is reasonably symmetric, so the mean and median will be close.

b. The sample mean is $\bar{x} = 9638/26 = 370.7$ sec, while the sample median is $\tilde{x} = (369+370)/2 = 369.50$ sec.

c. The largest value (currently 424) could be increased by any amount. Doing so will not change the fact that the middle two observations are 369 and 370, and hence, the median will not change. However, the value $x = 424$ cannot be changed to a number less than 370 (a change of $424 - 370 = 54$) since that will change the middle two values.

d. Expressed in minutes, the mean is (370.7 sec)/(60 sec) = 6.18 min, while the median is 6.16 min.

49.

a. $\Sigma x_i = 2.75 + \cdots + 3.01 = 56.80$, $\Sigma x_i^2 = 2.75^2 + \cdots + 3.01^2 = 197.8040$

b. $s^2 = \dfrac{197.8040 - (56.80)^2/17}{16} = \dfrac{8.0252}{16} = .5016, \quad s = .708$

51.

a. From software, $s^2 = 1264.77$ min^2 and $s = 35.56$ min. Working by hand, $\Sigma x = 2563$ and $\Sigma x^2 = 368501$, so

$$s^2 = \frac{368501 - (2563)^2/19}{19-1} = 1264.766 \text{ and } s = \sqrt{1264.766} = 35.564$$

b. If y = time in hours, then $y = cx$ where $c = \frac{1}{60}$. So, $s_y^2 = c^2 s_x^2 = \left(\frac{1}{60}\right)^2 1264.766 = .351\,\text{hr}^2$ and $s_y = cs_x = \left(\frac{1}{60}\right)35.564 = .593\,\text{hr}$.

55.

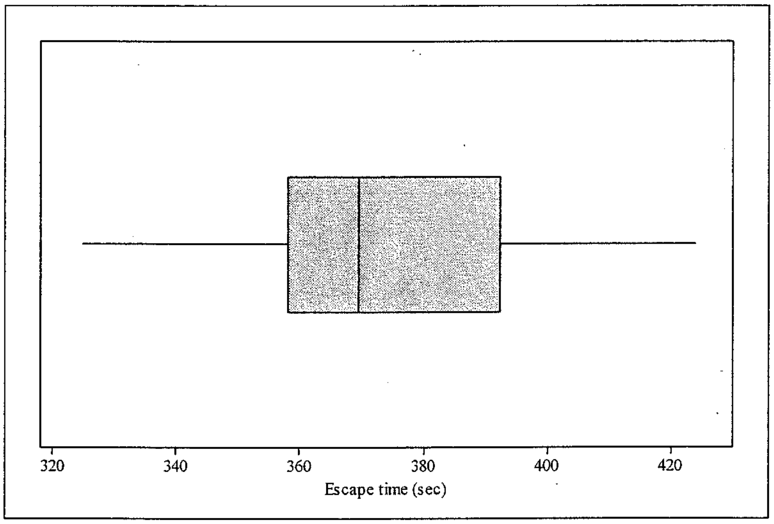
a. Lower half of the data set: 325 325 334 339 356 356 359 359 363 364 364 366 369, whose median, and therefore the lower fourth, is 359 (the 7th observation in the sorted list).

Upper half of the data set: 370 373 373 374 375 389 392 393 394 397 402 403 424, whose median, and therefore the upper fourth is 392.

So, $f_s = 392 - 359 = 33$.

b. inner fences: $359 - 1.5(33) = 309.5$, $392 + 1.5(33) = 441.5$
To be a mild outlier, an observation must be below 309.5 or above 441.5. There are none in this data set. Clearly, then, there are also no extreme outliers.

c. A boxplot of this data appears below. The distribution of escape times is roughly symmetric with no outliers. Notice the box plot "hides" the fact that the distribution contains two gaps, which can be seen in the stem-and-leaf display.



d. Not until the value $x = 424$ is lowered below the upper fourth value of 392 would there be any change in the value of the upper fourth (and, thus, of the fourth spread). That is, the value $x = 424$ could not be decreased by more than $424 - 392 = 32$ seconds.

60. A comparative boxplot (created in Minitab) of this data appears below. The burst strengths for the test nozzle closure welds are quite different from the burst strengths of the production canister nozzle welds. The test welds have much higher burst strengths and the burst strengths are much more variable. The production welds have more consistent burst strength and are consistently lower than the test welds. The production welds data does contain 2 outliers.