

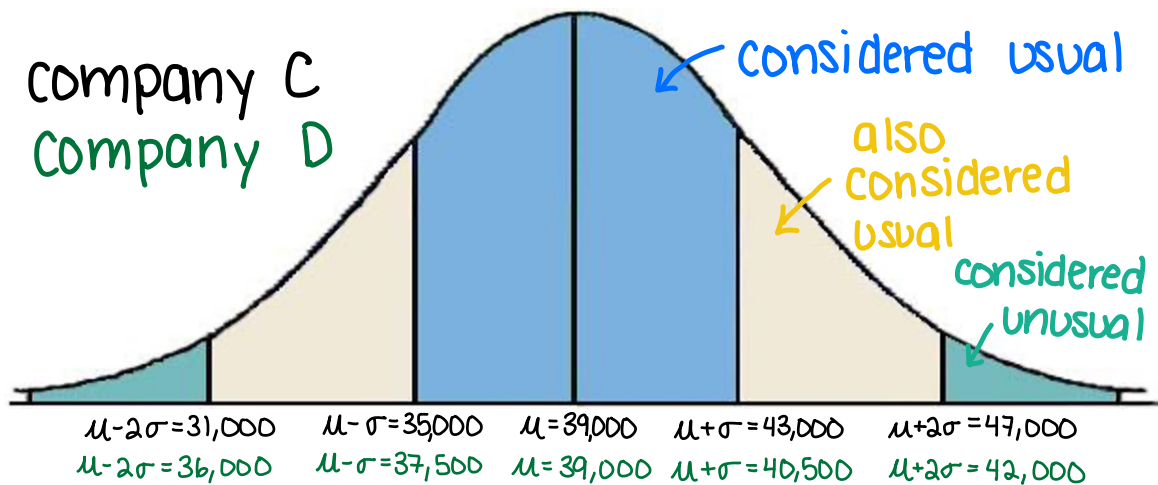
### Section 2.4 Additional Examples

- (1) You are applying for jobs at two companies, Company C offers starting salaries with  $\mu = \$39,000$  and  $\sigma = \$4,000$ . Company D offers starting salaries with  $\mu = \$39,000$  and  $\sigma = \$1500$ . From which company are you more likely to get an offer of \$42,000 or more? Explain your reasoning

**Solution** The mean of Company C is \$39,000 with standard deviation \$4,000. This means that a salary of \$42,000 lies within one standard deviation of the mean (i.e. is considered a usual salary).

Company D has mean \$39,000 and standard deviation \$1500, which means that a salary of \$42,000 lies at 2 standard deviations away from the mean and is therefore considered unusual. It would be more likely to be offered a salary of \$42,000 from Company C.

To see this visually, we can make the following two graphs for Company C and Company D:

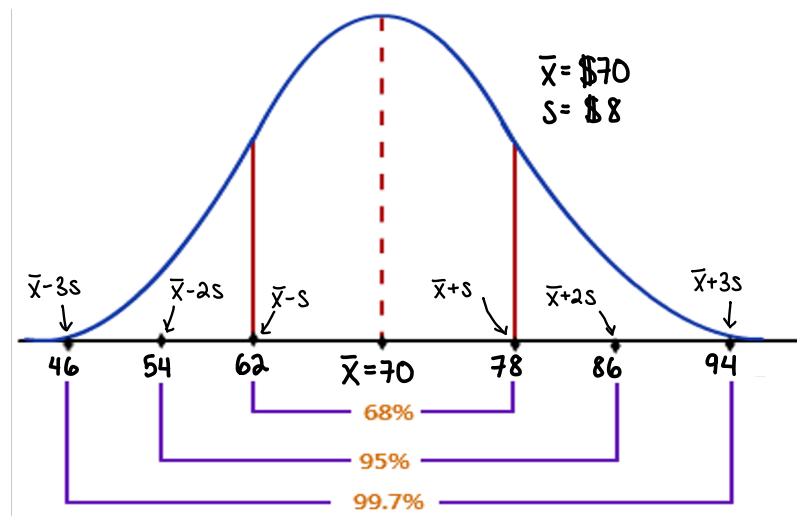


□

- (2) The mean monthly utility bill for a sample of households in a city is \$70, with a standard deviation of \$8.
- Between what two values do about 95% of the data lie?
  - If there are 40 households in the sample, estimate the number of households whose monthly utility bills are between \$54 and \$86.
  - The monthly utility bills for 8 more households are listed. Determine which of the data entries listed below are unusual. Explain your reasoning.

\$65, \$52, \$63, \$83, \$77, \$98, \$84, \$70

**Solution** Using the information provided, we can fill in the following graph for the Empirical Rule.



- Using the above image, we see that %95 of the data lies between the values of \$54 and \$86.
- Since %95 of the households fall between those two numbers, we just need to find %95 of 40.

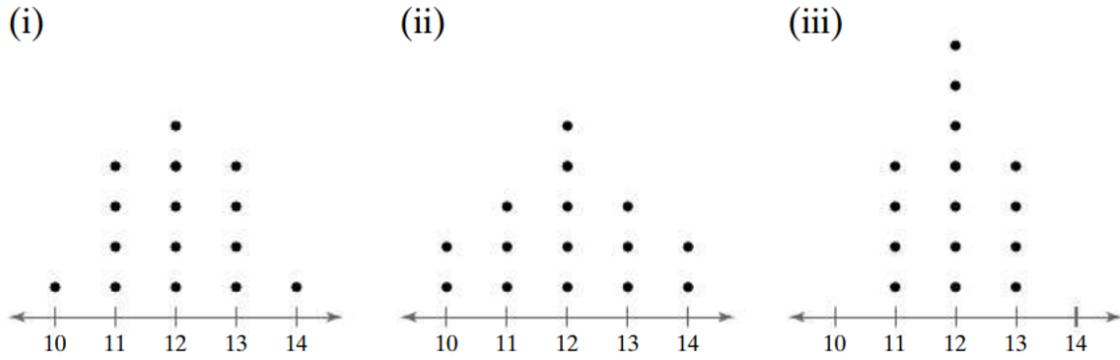
$$0.95 \cdot 40 = \boxed{38 \text{ households}}$$

- Anything outside of the 95% range of \$54 to \$86 is considered unusual. This means that the unusual data entries are

$$\boxed{52, 98}$$

□

- (3) Without doing any calculations, determine which data set (i), (ii), or (iii) is the data set with the greatest standard deviation and which data set is the data set with the least standard deviation. Explain your reasoning

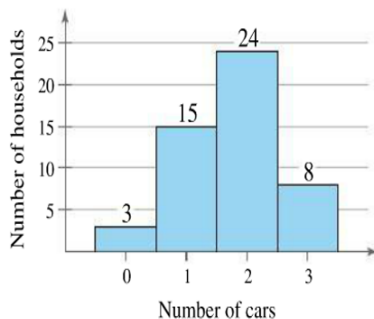


**Solution** The data set with the greatest standard deviation would be the one whose dots are most spread out, i.e. graph (ii). The data set with the least standard deviation would be the one whose dots are closest together, i.e. graph (iii).

□

- (4) Approximate the mean and standard deviation of the sample using the data set displayed.

**Cars per Household** The results of a random sample of the number of cars per household in a region are shown in the histogram.



**Solution** We can consider this a frequency table with the following data:

Cars	Frequency
0	3
1	15
2	24
3	8

Inputting this data into a graphing calculator (or doing the calculations by hand), we get that the mean and standard deviation are

$$\bar{x} \approx 1.7 \text{ and } s \approx 0.80$$

Note: this is what your calculator output should look like:

