Partner Practice

1. A man in a nursing home has his pulse taken every day. His pulse readings (beats per minute) over a one-month period appear below.

72	56	56	68	78	72	70	70	60	72	68	74
76	64	70	62	74	70	72	74	72	78	76	74
72	68	70	72	68	74	70					

a. Make a stemplot of the pulse data. Break the stem into 5 (for digits 01, 23, 45, 67, and 89).

Pulse readings over a one-month period

```
5 | 66
5 |
6 | 0
6 | 2
6 | 4
6 |
6 | 8888
7 | 000000
7 | 2222222
7 | 44444
7 | 66
7 | 88
```

KEY: 5 | 6 =
56 beats per minute

b. Determine the mean, median and mode for these data. Be sure to include units in your answers.

$$\bar{x} = \frac{\Sigma x_i}{n}$$

$$\frac{(n+1)}{2} = \frac{31+1}{2} = \frac{32}{2} = 16\text{th entry}$$

$\bar{x}$= Mean ≈ 70.1 beats/min;   median = 72 beats/min;   mode = 72 beats/min.

c. Based on these data, which measure (or measures) from (b) do you think best describes the man's typical pulse rate? Explain your reasoning.

The median of 72 beats/min best describes a "typical" pulse rate for this man. In addition, the mode is also 72 beats/minute. (The mode is the man's most frequent pulse rate.) There are a few days when the man's pulse rate is very low. These low values tend to pull the mean down.

2. Eating fish contaminated with mercury can cause serious health problems. Mercury contamination from historic gold mining operations is fairly common in sediments of rivers, lakes, and reservoirs today. A study was conducted on Lake Natoma in California to determine if the mercury concentration in fish in the lake exceeded guidelines for safe human consumption. A sample of 83 largemouth bass was collected and the *← n=83* concentration of mercury from sample tissue was measured. Mercury concentration is measured in micrograms of mercury per gram or µg/g. The histogram in *Figure 4.8* presents results from this study.
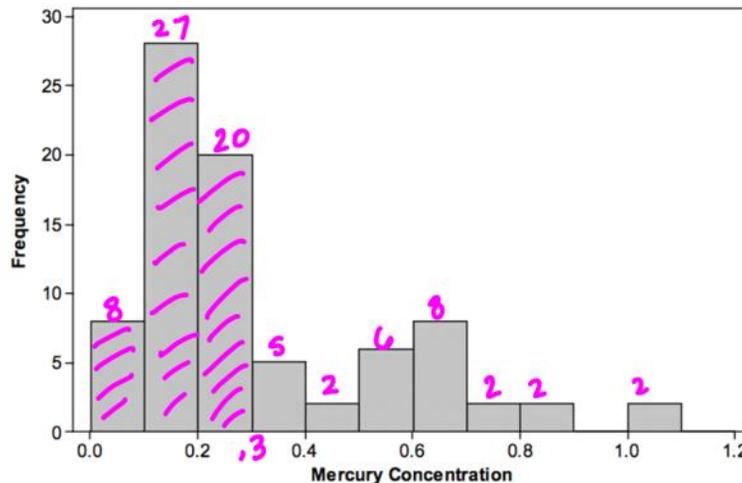

Figure 4.8 Histogram of mercury concentration in fish.

a. The primary objective of the study was to determine if mercury concentrations in fish tissue exceeded safety guidelines for human consumption. The U.S. Environmental Protection Agency (USEPA) human health criterion for methylmercury in fish is 0.30 µg/g. Approximately how many of the fish in the sample had mercury concentrations below the level set by the EPA (and hence were considered safe for human consumption)?

Approximately 56 of the fish had mercury levels below *0.30 µg/g.*

b. Approximately what percentage of the sample had mercury concentrations higher than the level set by the EPA? Show how you arrived at your answer.

Approximately *27* of the fish from the sample had mercury levels at or above *0.30 µg/g.* Hence, around 32.5% of the fish in the sample had levels of mercury concentration above the EPA guidelines.

$$\frac{27}{83} = \frac{n}{100} \qquad \frac{83n}{83} = \frac{2700}{83} \qquad n \approx 32.53\%$$

c. Would the mean mercury concentration be larger, smaller, or about the same as the median mercury concentration? Explain.

Because the data are skewed to the right, the few high mercury concentration values in the tail will inflate the mean but not affect the median. Hence, the mean mercury concentration will be larger than the median mercury concentration.

3. Do adolescent girls eat fruit? We all know that fruit is good for us. Below is a bar graph of the number of servings of fruit per day claimed by 74 seventeen-year-old girls in a study in Pennsylvania. *

* Bars must add to 74
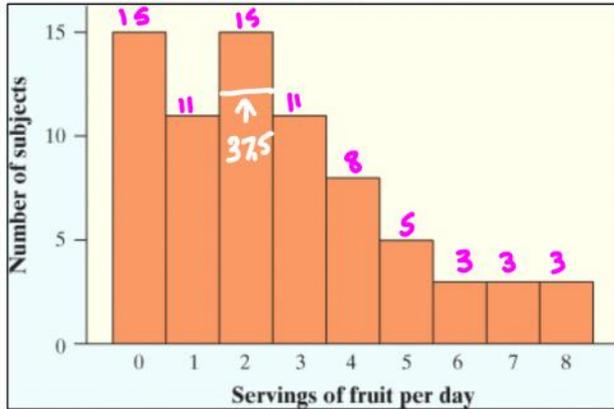
★ Why is this a bar graph and not a histogram?

the X-Axis is not labled with intervals. (So "0", "1","2",... are considered categories.)

a. Find the median. Explain your method clearly.

$$\frac{(n+1)}{2} = \frac{74+1}{2} = 37.5$$

the 37.5th piece of data falls in the category of 2 pieces of fruit.

b. Find the mode of the data.

0 and 2 pieces of fruit.

c. Estimate the mean of the distribution. **EXPLAIN!**

$\bar{x} \approx 3$ *pieces of fruit*

Since the data is skewed to the right, the mean is greater than the median.

4. Cowboys. The 2011 roster of the Dallas Cowboys professional football team included 7 defensive line-men. Their weights (in pounds) were 321, 285, 300, 285, 286, 293, and 298.

$$\bar{x} = \frac{\sum x_i}{n} = \frac{321+285+300+285+286+293+298}{7}$$

Calculate the mean. Show your work. $\bar{x} = 295.4286$ *lbs*

5. Quiz grades Joey's first 14 quiz grades in a marking were:

| 87 | 86 | 84 | 91 | 75 | 78 | 80 | 93 |
| 74 | 87 | 76 | 96 | 82 | 90 | 98 | |

Calculate the mean. Show your work. _____ *85.1333* _____

$$\bar{x} = \frac{\sum x_i}{n} = \frac{1277}{14} = 85.1333$$