

## HOMEWORK 2

### ELEMENTARY STATISTICS & INFERENCE (STAT:2020; BOGNAR)

1. Consider the following stem-and-leaf plot (note: the largest number in the dataset is 122).

```
stem | leaves
  8  | 2299
  9  | 12477
 10  |
 11  |
 12  | 2
```

- (a) Does the dataset contain any outliers? If so, which data point(s) is an outlier?
- (b) Determine the 5-number summary.
- (c) Compute the range and interquartile range (IQR).
- (d) Construct a boxplot for this dataset.
- (e) For this dataset, should centrality be described using the sample mean  $\bar{x}$  or sample median  $Q_2$ ? Why?
- (f) Is this dataset skewed to the left, skewed to the right, or symmetric?
- (g) Based upon your answer in (1f), do you expect the sample mean  $\bar{x}$  to be greater than or less than the sample median  $Q_2$ ? Why?
- (h) Verify your intuition in part (1g): compute the sample mean  $\bar{x}$  and compare to the sample median  $Q_2$ .
2. The expenditures (in dollars) of 3 customers at a coffee shop were: 2.25, 2.25, 4.50.
- (a) Find the sample mean  $\bar{x}$ .
- (b) Find the sample standard deviation  $s$ .
- (c) Find the sample variance  $s^2$ .
3. Consider the following dataset: 8, 8, 10, 8, 6.
- (a) Find the sample mean  $\bar{x}$ .
- (b) Find the sample standard deviation  $s$ .
- (c) Find the sample variance  $s^2$ .
4. Suppose a standard 6-sided die is rolled 4 times. How many outcomes are in the sample space  $\mathcal{S}$ ?
5. Suppose a 6-sided die (with sides labeled 1, 2, 3, 4, 5, 6) is rolled 2 times.
- (a) Write out the sample space  $\mathcal{S}$ . *Note that all outcomes are equally likely.*
- (b) Let  $A$  denote the event that a 1 is obtained on the first roll, and let  $B$  denote the event that an even is obtained on the second roll. Find  $P(A \text{ and } B)$ .
- (c) Find the probability that the second roll is exactly twice the first roll.
- (d) Find the probability that the second roll is greater than or equal to the first roll.
6. Repeat question (5) when rolling a 4-sided die (with sides labeled 1, 2, 3, 4).