prob and stats HW 1-2

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1.5

$$(\mathbf{s}')^{2} = \frac{1}{n} \sum_{i=1}^{n} (y_{i} - \bar{y})^{2}, \text{ expanding}$$

$$= \frac{1}{n} \sum_{i=1}^{n} (y_{i}^{2} - 2y_{i}\bar{y} + \bar{y}^{2})$$

$$= \frac{1}{n} (\sum_{i=1}^{n} y_{i}^{2} - \sum_{i=1}^{n} 2y_{i}\bar{y} + \sum_{i=1}^{n} \bar{y}^{2}), \text{ using identity (a,b)}$$

$$= \frac{1}{n} (\sum_{i=1}^{n} y_{i}^{2} - 2\bar{y} \sum_{i=1}^{n} y_{i} + \sum_{i=1}^{n} \bar{y}^{2})$$

$$= \frac{1}{n} (\sum_{i=1}^{n} y_{i}^{2} - 2\bar{y}n + n\bar{y}^{2})$$

$$= \frac{1}{n} (\sum_{i=1}^{n} y_{i}^{2} - \bar{y}n)$$

$$(\mathbf{s}')^{2} = \frac{1}{n} (\sum_{i=1}^{n} y_{i}^{2} - \frac{1}{n} (\sum_{i=1}^{n} y_{i})^{2})$$

Histograms

Relative frequency histogram for Ch1.2 0.4 0.3 mean : 22.556818181818183 variance : 147.70251057082453 stdDev : 12.153292170059293 0.1 0.0 20 30 40 50 60 70

Figure 1: The Histogram for 1.2

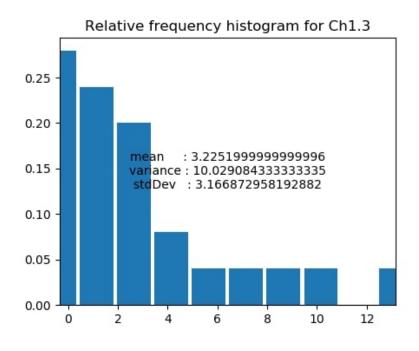


Figure 2: The Histogram for 1.3

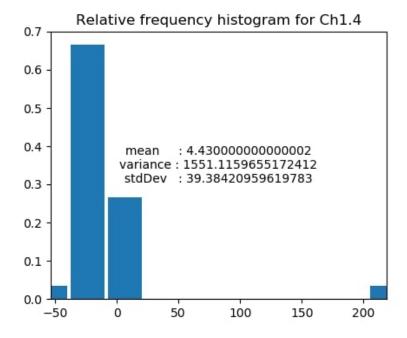


Figure 3: The Histogram for 1.4

Section 2.3

1. 2.1

- $\bullet \ A = \{ff\}$
- $B = \{mm\}$
- $C = \{mf, fm\}$
- $\bullet \ A\cap B=\varnothing$
- $\bullet \ A \cup B = \{ff, mm\}$
- $A \cap C = \emptyset$
- $A \cup C = \{ff, mf, fm\}$
- $B \cap C = \emptyset$
- $\bullet \ B \cup C = \{mm, mf, fm\}$
- $C \cap \bar{B} = \{mf, fm\}$

2. 2.2

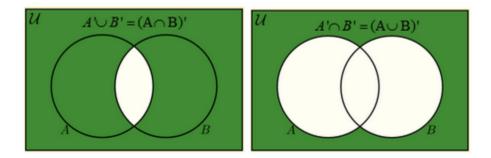


Figure 4: Venn Diagrams - I have versions where I drew by hand but these looked nicer

3. 2.4

- $A = \{(M_1, M_2), (M_1, M_3), (M_2, M_3)\}$
- $\bullet \ B^c = A$
- $\bullet \ A \cup B = S$
- $\bullet \ A \cap B = \varnothing$
- $\bullet \ A \cap B = A$

4. 2.5

- (36-3)+(9)=42
- (36 3) = 33
- (24 (9 3) = 18