

3.3: Summary Statistics: Measures of Center

Class Prep Assignment

Due at the beginning of next class

We Describe Four Characteristics of Data: Shape, Center and Spread, and Outliers

Example. The grades on the third exam for a MTH 95 class were as follows:

82 74 67 81 49 84 52 91 66 75 96 73 71 78 49 86 85 62 58

a) Make a histogram of the data to determine its shape.

Shape of the Histogram:

Unimodal

Bimodal

Multimodal

Symmetric

Skewed to the Left
(Mean less than median)

Skewed to the Right
(Mean greater than median)

Measures of Center or Average

Mean:

Median:

odd number of values:

even number of values:

Mode:

b) Arrange the grades above in order:

c) Find the mean

d) Find the median

e) Find the mode(s), if any

3.4: Summary Statistics: Measures of VariationClass Prep AssignmentDue at the beginning of next class**Measures of Spread**

Range:

Interquartile Range (IQR):

Standard Deviation:

Five-Number Summary and Boxplot: Minimum, Q_1 , Median, Q_3 , Maximum

Continuing with the test scores in order, find the following:

49, 49, 52, 58, 62, 66, 67, 71, 73, 74, 75, 78, 81, 82, 84, 85, 86, 91, 96

f) Five-number summary:

g) Range:

h) Interquartile Range (IQR):

i) Draw and label the boxplot:

Outliers

j) Are there any outliers in this data?

Which Measures to Use?

If the data is symmetric, use the mean and standard deviation

If the data is skewed, use the median and the IQR

Standard Deviation

Standard Deviation The "average deviation from the mean." Can be approximated by the Range ÷ 4 if the data is evenly spread without outliers.

$$s = \sqrt{\frac{\sum(x - \text{mean})^2}{n - 1}}$$

49, 49, 52, 58, 62, 66, 67, 71, 73, 74, 75, 78, 81, 82, 84, 85, 86, 91, 96

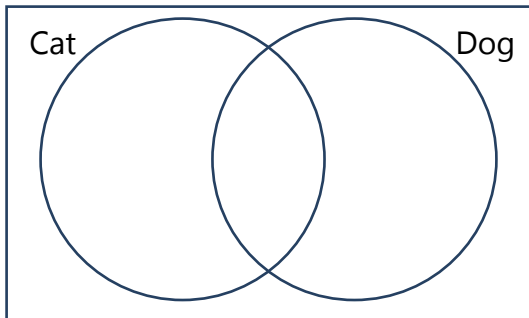
Data	Deviation from Mean	Squared Deviation
49		
49		
52		
58		
62		
66		
67		
71		
73		
74		
75		
78		
81		
82		
84		
85		
86		
91		
96		
Sum of the squared deviations:		

$$s = \sqrt{\frac{\sum(x - \text{mean})^2}{n - 1}} =$$

Standard Deviation Approximation: Range/4. How do they compare in this case?

4.1: Contingency TablesClass Prep AssignmentDue at the beginning of next class**Relating Venn Diagrams to Contingency Tables:**

250 households were surveyed and 180 said they have a cat, 95 said they have a dog, and 52 said they have a cat and a dog. Fill in the Venn diagram and the contingency table.



	Dog	No Dog	Total
Cat			
No Cat			
Total			

We will use contingency tables to find 4 types of probabilities: Marginal, AND, OR, Conditional

MARGINAL

Find the probability that a randomly selected person from the study has a cat.

$$P(\text{cat}) =$$

AND

Find the probability that a randomly chosen person from the study has a cat AND a dog.

$$P(\text{cat AND dog}) =$$

OR

Find the probability that a randomly chosen person from the study has a cat OR no dog.

$$P(\text{cat OR no dog}) =$$

CONDITIONAL

Given that a person from the study has a dog, what is the chance they have a cat?

$$P(\text{cat given dog}) =$$