

Chapter 5 Review: Statistics

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Z-Score Table p.592

Key Concepts: Central Tendency, Standard Deviation, Graphing, Normal Distribution, Z-Score, Confidence

Central Tendency

- 1) Mean = The calculated _____. Add up the numbers and divide by how many there are.
- 2) Median = The _____ number (might be half way between two numbers in the list)
- 3) Mode = The number that occurs _____
- 4) **Standard Deviation** = The average _____ of each number from the _____

FORMULA FOR STANDARD DEVIATION:

$$\sigma = \sqrt{\frac{\text{sum of the squares of the differences from the mean}}{\text{number of values}}}$$

Example: Find all measures of central tendency for the following list of numbers:

6,4,9,4,8,5

- a) Mean
- b) Median
- c) Mode
- d) Standard Deviation

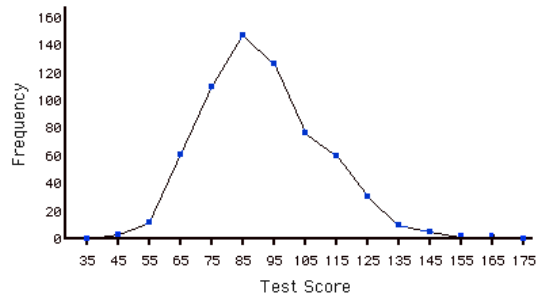
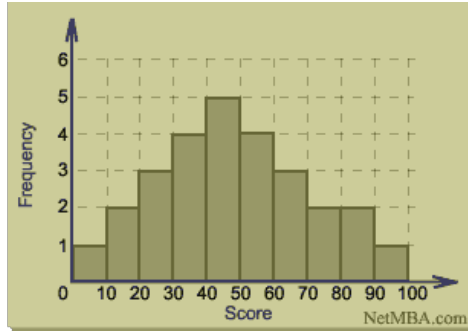
Graphing

For larger sets of data, we break it into chunks to find the measures of central tendency. We also draw graphs to represent the data:

Histogram = _____

Frequency Polygon = _____

Examples:

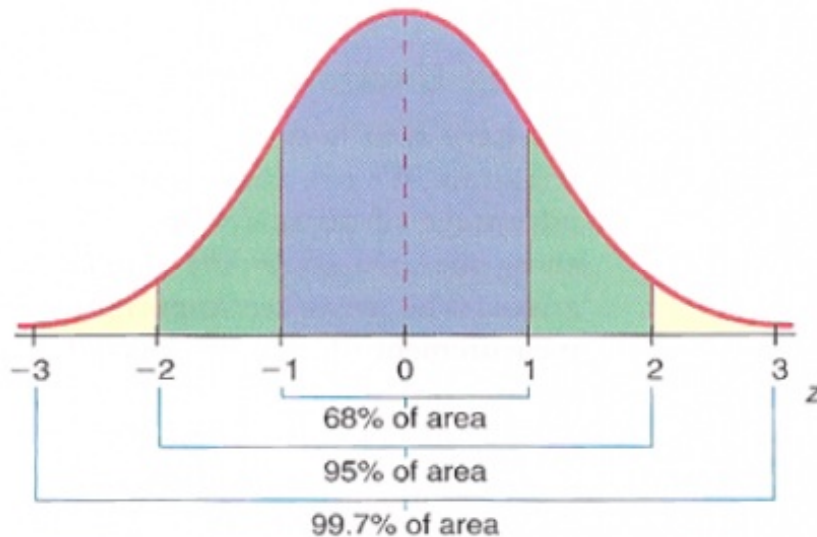


For large data like this, you can input the numbers into your calculator to find the measures of central tendency. Remember to use the _____ number for each category.

Step #1: _____, _____,

Step #2: _____, _____, _____

Normal Distribution



Z-Scores

The z-score is the distance from a point to the _____, in terms of _____.

If I am 1.5 standard deviations above the mean, then my z-score is ____

If I am 0.6 standard deviations below the mean, then my z-score is ____

Formula:
$$Z = \frac{x - \mu}{\sigma}$$

Confidence

For interpreting a survey

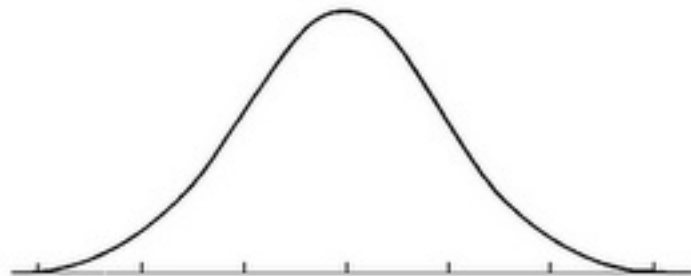
1) Confidence interval = a specific interval estimate of the whole population by using information obtained from a sample. (example: between 9.5 and 10.2 million people are likely to vote for the Liberal party)

2) Margin of error = the possible difference between your estimate based on the survey and real-life. (example: 40% will vote Conservative with a margin of error of $\pm 3\%$)

3) Confidence level = the probability that the answer in real-life matches your estimate from the survey. (example: this survey is correct 19 times out of 20)

Key Example: The average score on an normally distributed exam is 64% with a standard deviation of 7%.

a) Label the normal curve



b) Find the percentage of people who score a C (between 60% and 73%)

Chapter 5 Review: Statistics

Practice #1: Find the measures of central tendency for the marks on sample of 10 quizzes: 14,12,17,3,8,12,15,8,10,11

- a) Mode(s)
- b) Median
- c) Mean
- d) Standard Deviation

Practice #2: Students recorded their heights, in inches, when they graduated from kindergarten in 1999 and again when they graduated from high school in 2011.

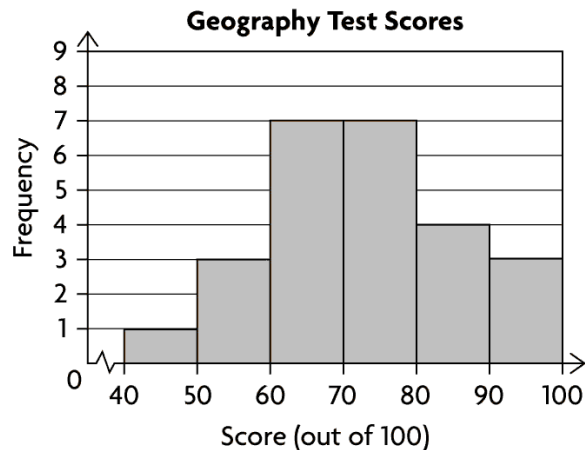
1999: 39 41 41 43 45 46 47 46 48 47 44 38 41 39 43 46 44

2011: 60 74 76 62 64 61 66 68 71 76 74 73 72 69 64 63 60

- a. Determine the mean and standard deviation for each year.

- b. In which year are the heights most consistent?

Practice #3: Find the measure of central tendency for the following histogram:



- a) Mode(s)
- b) Median
- c) Mean
- d) Standard Deviation

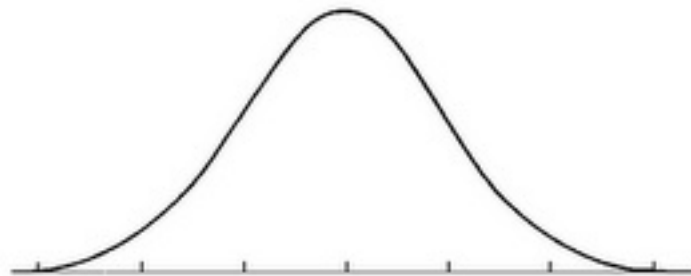
Practice #4: Four groups of students recorded their pulse rates after a 2 km run.

Group 1	126	168	158	192	146	166	104	164	116	138
Group 2	158	132	156	160	108	150	178	136	172	140
Group 3	136	174	156	176	150	166	142	156	130	182
Group 4	144	150	142	152	174	176	118	152	178	164

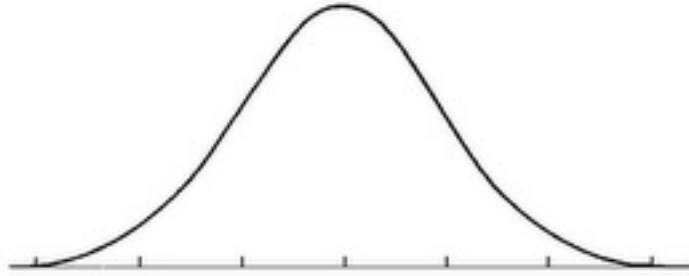
- Make a frequency table with five intervals to organize the pulse rates.
- Construct a histogram of the data.

Interval	Frequency
1) 100 -	
2)	
3)	
4)	
5) - 200	

Practice #5: Suppose scores on an IQ test are normally distributed. If the test has a mean of 100 and a standard deviation of 10, what is the probability that a person who takes the test will score between 90 and 110?



Practice #6: A machine is used to fill soda bottles. The amount of soda dispensed into each bottle varies slightly. Suppose the amount of soda dispensed into the bottles is normally distributed. If at least 99.7% of the bottles must have between 585 and 595 milliliters of soda, find the greatest standard deviation, to the nearest hundredth, that can be allowed.



Practice #7: Determine the z-score for the given value.

$$\mu = 120, \sigma = 10, x = 125$$

Practice #8:

Determine the percent of data to the left of the z-score: $z = -1.50$.

Determine the percent of data to the right of the z-score: $z = 2.26$.

Practice #9: What is the probability of getting a z-score of...

a) Less than 1.61?

b) Less than -0.55?

Practice #10: An IQ test has a mean of 100 with a standard deviation of 15. What is the probability of getting less than 80 on the test?

