

**Intro Stats (Math 1040 in PDF supplied) Pg No. 65-69**  
**Gould, Introductory Statistics Exploring the World Through Data, 4e ©2025 NASTA**

| Standards   | Objectives   | Breakouts   | Pg No   | Topic  |
|---|--|---|---------|--|
| Standard I: Students will understand, use, and evaluate random processes underlying statistical analysis. | Objective 1: Use sample survey data collected through random samples to draw conclusions about populations.  | a. Recognize sources of bias C4:C38d discuss how surveys may be intentionally biased to support certain agendas.  | 331-332 | SECTION 7.2: Measuring the Quality of a Survey                 |
|   |  | b. Explain the importance of randomness in good survey design.  | 376     | 7.86 Fast Food   |
|   |  | c. Pose a question, choose an appropriate method of random selection, conduct a survey, and summarize the results in graphical displays.  | 324-329 | Survey Terminology   |
|   |  | d. Distinguish between different survey designs such as SRS, cluster sampling, stratified sampling, and systematic sampling.  | 613-614 | Systematic Sampling<br>Stratified Sampling<br>Cluster Sampling |
|   | Objective 2: Describe and use the features of good experimental design, such as random assignment of treatments, controls, placebos, blinding, and blocking. | a. Distinguish between an observational study and an experiment, and be able to select which method is appropriate to collect desired information.  | 21-23   | Observational Studies  |
|   |  | b. Recognize possible sources of bias in various experiments, and describe how the features of good experimental design will reduce bias.   | 24      | Random Assignment  |
|   |  | c. Pose a question, conduct one or more simple experiments using appropriate features of experimental design for the data that is being collected, and summarize the results in graphical displays. | 600     | Experimental Design  |

Objective 3: Discuss and interpret surveys, experiments, and observations using information from government data, current events, medical experiments, polls, and news media.

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| d. Explain the importance of experimental ethics, and debate historical violations of experimental ethics.   | 28        | Ethics   |
| a. Consider the reasonableness of claims of data from various sources, using examples to illustrate the uses and misuses of statistics that appear in the media. | 27<br>186 | Statistics in the News<br>DATA PROJECT 4: Get it Sorted        |
| b. Distinguish between causality and correlation, and be able to recognize unwarranted conclusions.  | 179       | Correlation Is Not Causation                                   |
| c. Recognize when data is misrepresented by graphical manipulation, such as modified axes or use of incorrect visual proportions.                                | 67        | Misleading Graphs  |
| d. Discuss the role of government reports such as the consumer price index for making comparisons in data.   | 83        | 2.55 Species Extinction  |
| e. Calculate percent change and perform simple calculations for price changes over the years due to inflation.   | NA        | NA   |
| a. Distinguish between quantitative and categorical data.  | 7         | Two Types of Variables   |
| b. Use quantitative data to create dot plots, stem plots, histograms, box plots, and scatter plots and use them to make sense of the data.                       | 44-50     | SECTION 2.1:<br>Visualizing Variation in Numerical Data        |
| c. Use categorical data to create circle graphs, bar graphs and frequency tables and use them to make sense of the data.   | 59-60     | SECTION 2.3:<br>Visualizing Variation in Categorical Variables |

Standard II: Students will summarize and interpret data.

Objective 1: Interpret and display data by selecting appropriate graphical methods.

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| Objective 2: Summarize data and be able to use technology such as calculators or computer software to assist in calculations.                       | a. Calculate measures of center, and estimate center from data presented in a variety of forms, such as charts, tables, and graphs.     | 114-118        | SECTION 3.4:<br>Comparing Measures of Center                           |
|   | b. Select and interpret appropriate measures of spread.   | 117            | Many Modes:<br>Summarizing Center and Spread                           |
|   | c. Describe the distribution of data considering shape, skewness, modality, and outliers.   | 107            | SECTION 3.3:<br>Summaries for Skewed Distributions                     |
| Objective 3: Use data summaries to interpret and compare data.  | a. Describe and compare individual performances in terms of quartiles, percentiles and standard deviations.                             | 111-114        | Calculating the Interquartile Range                                    |
|   | b. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of outliers.     | 116-117        | The Effect of Outliers<br>Many Modes:<br>Summarizing Center and Spread |
|   | c. Use statistics appropriate to the shape of the data distribution to compare center and spread of two or more different data sets.    | 118            | Comparing Two Groups with Different-Shaped Distributions               |
| Objective 4: Describe the characteristics of the normal distribution, and create an understanding of the standard deviation as a measure of spread. | a. Examine data sets that approximate the normal distribution, and recognize the characteristics of data that are normally distributed. | 273-276<br>317 | Visualizing the Normal Distribution<br>EXAMPLE A: NORMAL               |
|   | b. Compare individual measurements using the mean and standard deviation to find standardized scores and identify unusual data points.  | 274<br>281     | Figure 6.10<br>Figure 6.22   |
|   | c. Use the 68%–95%–99.7% rule to determine the probability of events.   | 279-282        | Without Technology:<br>Apply The Empirical Rule                        |

Standard III: Students will make inferences and justify conclusions based on data.

Objective 1: Summarize, represent, and interpret bivariate data.

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| d. Use the 68%–95%–99.7% rule to create and explain confidence intervals.   | 350       | Figure 7.15   |
| a. Create and use graphs of bivariate data to visually assess trends and recognize patterns.  | 164 - 167 | SECTION 4.3: Modeling Linear Trends   |
| b. Calculate regression lines and correlation coefficients for linear data using technology such as calculators or computer software.       | 168-170   | Example 4: SAT Scores and GPAs<br>Example 5: Technology Output for Regression |
| c. Use regression equations to make appropriate predictions.  | 165-172   | The Regression Line   |
| d. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.                     | 178       | SECTION 4.4:<br>Evaluating the Linear Model                                   |
| e. Make predictions based on patterns and trends of non-linear data, such as seasonal data, tidal tables, sunspots, and population changes. | 154       | Figure 4.6  |
| a. Describe the effect of outliers on predictions.  | 116       | The Effect of Outliers  |
| b. Recognize and discuss the pitfalls of extrapolation in predictions.  | 178 - 181 | Pitfalls to Avoid<br>Don't Extrapolate!                                       |
| c. Compare actual data measurements with predicted values, and discuss the reasonableness of predictions.                                   | 103       | Example 7   |

Objective 2: Display and compare data to make predictions and formulate conclusions.

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|  | Objective 3: Make inferences and justify conclusions from sample surveys, experiments, and observational studies.  | a. Understand statistics as a process for making inferences about population parameters based on a random sample from that population.   | 324-326     | Survey Terminology  |
|  |  | b. Understand and interpret confidence intervals generated from data.  | 347-360-361 | SECTION 7.4:<br>Estimating the Population Proportion with Confidence Intervals<br>Interpreting Confidence Intervals for Two Proportions |
|  |  | c. Use the results of hypothesis testing to interpret sample data and draw conclusions.  | 610         | Example 4: Comparing Tuitions   |
| Standard IV: Students will understand and use probability rules. | Objective 1: Use the rules of probability to calculate independent and conditional probabilities in real contexts. | a. Distinguish between subjective, experimental, and theoretical probability.  | 218-262     | Theoretical, Empirical, and Simulation-Based Probabilities<br>5.124 Soda e.   |
|  |  | b. Calculate probabilities using addition and multiplication rules, tree diagrams, and twoway tables using correct probability notation. | 368         | 7.24 Views on Capital Punishment  |
|  |  | a. Distinguish between subjective, experimental, and theoretical probability.  | 218         | Theoretical, Empirical, and Simulation-Based Probabilities  |
|  | Objective 1: Use the rules of probability to calculate independent and conditional probabilities in real contexts. | b. Calculate probabilities using addition and multiplication rules, tree diagrams, and twoway tables using correct probability notation. | 15          | Table 1.6<br>Example 5: Percentages of Seat Belt Wearers  |
|  |  | c. Calculate conditional probabilities of compound events using twoway tables and Venn diagrams.   | 229-231     | Conditional Probabilities   |

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| Objective 2: Adapt probability models to solve real-world problems.  | d. Use permutations and combinations to find probabilities.   | 294       | Example 14: ESP with 10 Trials  |
|  | a. Perform simulations to estimate probability outcomes using technology and objects such as coins, spinners, cards, and dice.  | 243-245   | Example 21: Dice Simulation   |
|  | b. Identify and explain common misconceptions regarding probability, including long-run vs. short-run behavior.   | 352       | Interpreting Confidence Intervals   |
|  | c. Discuss probability applications in decision making, using terms such as "odds" and "risk," including applications in insurance, medical treatments, and extreme sports. | 198-622   | 4.46 Life Insurance and Age<br>Clinical Significance vs. Statistical Significance |
| Objective 3: Use probability to make decisions and analyze outcomes. | a. Calculate expected values and use them to solve problems.  | 529-732   | Example 8: Swine Flu Hospitalizations<br>Exercise 10.21- Dreidel Spinning         |
|  | b. Develop a probability distribution for a random variable and find the expected value.  | 267 - 273 | SECTION 6.1:<br>Probability Distributions Are Models of Random Experiments        |
|  | c. Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.   | 306       | 6.5 Loaded Die  |
|  | d. Use probabilities to make fair decisions.  | 384       | SECTION 8.1: The Essential Ingredients of Hypothesis Testing                      |