

Intro Stats (Math 1040 in PDF supplied) Pg No. 65-69
Larson, Elementary Statistics: Picturing the World, 8e ©2023 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 in surveys, and discuss how surveys may be intentionally biased to support certain agendas.	23 31	Example 4 Exercises 23–28
		b. Explain the importance of randomness in good survey design.	19	Definition Randomization
		c. Pose a question, choose an appropriate method of random selection, conduct a survey, and summarize the results in graphical displays.	25	Acne Treatment
		d. Distinguish between different survey designs such as SRS, cluster sampling, stratified sampling, and systematic sampling.	21-23	Sampling Techniques
	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.	18	Example 1
		b. Recognize possible sources of bias in various experiments, and describe how the features of good experimental design will reduce bias.	23 31	Example 4 Exercises 23–28
		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.	19-20	Experimental Design Example 2 Analyzing an Experimental Design
		d. Explain the importance of experimental ethics, and debate historical violations of experimental ethics.	28	Ethics
	Objective 3: Discuss and interpret surveys, experiments, and observations using information from government data, current events, medical	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.	28	Uses and Abuses: Statistics in the Real World
		b. Distinguish between causality and correlation, and be able to recognize unwarranted conclusions.	480	Correlation and Causation
		c. Recognize when data is misrepresented by graphical manipulation, such as modified axes or use of incorrect visual proportions.	NA	

	experiments, polls, and news media.	d. Discuss the role of government reports such as the consumer price index for making comparisons in data.	566	Vacuum Cleaners
		e. Calculate percent change and perform simple calculations for price changes over the years due to inflation.	NA	
Standard II: Students will summarize and interpret data.	Objective 1: Interpret and display data by selecting appropriate graphical methods.	a. Distinguish between quantitative and categorical data.	9	Types of Data
		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.	55-57	Graphing Quantitative Data Sets
		c. Use categorical data to create circle graphs, bar graphs and frequency tables and use them to make sense of the data.	58-59	Graphing Qualitative Data Sets
	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.	67-70	Mean, Median, and Mode
		b. Select and interpret appropriate measures of spread.	82-87	Range Variance and Standard Deviation Interpreting Standard Deviation
		c. Describe the distribution of data considering shape, skewness, modality, and outliers.	70 73	Definition An outlier The Shapes of 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.	102-108	Measures of Position
		b. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of outliers.	73	The Shapes of Distributions
		c. Use statistics appropriate to the shape of the data distribution to compare center and spread of two or more different data sets.	74	Graphical Analysis
	Objective 4: Describe the characteristics of the normal distribution, and	a. Examine data sets that approximate the normal distribution, and recognize the characteristics of data that are normally distributed.	234-236	Properties of a Normal Distribution

	create an understanding of the standard deviation as a measure of spread.	b. Compare individual measurements using the mean and standard deviation to find standardized scores and identify unusual data points.	235	Example 1 Understanding Mean and Standard Deviation
		c. Use the 68%–95%–99.7% rule to determine the probability of events.	88-89	Empirical Rule (or 68–95–99.7 Rule) Example 6 Using the Empirical Rule
		d. Use the 68%–95%–99.7% rule to create and explain confidence intervals.	303	Try it Yourself 5
Standard III: Students will make inferences and justify conclusions based on data.	Objective 1: Summarize, represent, and interpret bivariate data.	a. Create and use graphs of bivariate data to visually assess trends and recognize patterns.	502	Prediction Intervals
		b. Calculate regression lines and correlation coefficients for linear data using technology such as calculators or computer software.	475 488	Example 5 Using Technology to Calculate a Correlation Coefficient Example 2 Using Technology to Find a Regression Equation
		c. Use regression equations to make appropriate predictions.	486-487	Regression Lines
		d. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	486-487	Regression Lines
		e. Make predictions based on patterns and trends of non-linear data, such as seasonal data, tidal tables, sunspots, and population changes.	495	Logarithmic Equation
	Objective 2: Display and compare data to make predictions and formulate conclusions.	a. Describe the effect of outliers on predictions.	NA	
		b. Recognize and discuss the pitfalls of extrapolation in predictions.	NA	
		c. Compare actual data measurements with predicted values, and discuss the reasonableness of predictions.	NA	
	Objective 3: Make inferences and justify conclusions from sample	a. Understand statistics as a process for making inferences about population parameters based on a random sample from that population.	209	Population Parameters of a Binomial Distribution

	surveys, experiments, and observational studies.	b. Understand and interpret confidence intervals generated from data.	301	Example 3 Constructing a Confidence Interval
		c. Use the results of hypothesis testing to interpret sample data and draw conclusions.	356-357	Making a Decision and Interpreting the Decision
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.	134-137	Types of Probability
		b. Calculate probabilities using addition and multiplication rules, tree diagrams, and twoway tables using correct probability notation.	149-151 158-160	The Multiplication Rule The Addition Rule
		c. Calculate conditional probabilities of compound events using twoway tables and Venn diagrams.	147	Conditional Probability
		d. Use permutations and combinations to find probabilities.	172-173	Example 6 Finding Probabilities Example 7 Finding Probabilities Example 6 Finding Probabilities
	Objective 2: Adapt probability models to solve real-world problems.	a. Perform simulations to estimate probability outcomes using technology and objects such as coins, spinners, cards, and dice.	166	Activity: Simulating the Probability of Rolling a 3 or 4
		b. Identify and explain common misconceptions regarding probability, including long-run vs. short-run behavior.	NA	
		c. Discuss probability applications in decision making, using terms such as "odds" and "risk," including applications in insurance, medical treatments, and extreme sports.	186	Exercises
	Objective 3: Use probability to make decisions and analyze outcomes.	a. Calculate expected values and use them to solve problems.	196	Example 7 Finding an Expected Value
		b. Develop a probability distribution for a random variable and find the expected value.	200 198	Exercises 37 and 38 Exercises 19 and 20
		c. Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.	NA	

