Teacher: CORE AP Statistics | Year: 2017-2018
Course: AP Statistics | Month: All Months

S Exploring Data: Observing patterns and departures from patterns

e

Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Lessons	Resources	Standards
p How can we organize, describe, and interpret a	Interpreting graphical displays of distributions of univariate data (dotplot, stemplot, histogram, cumulative frequency plot)	Visually determine center and spread	individuals, variables, categorical, quantitative			**Text: "The Practice of Statistics" by Starnes and Tabor, 5th Ed**	
t large set of data with a graphical display or a numerical summary?	Summarizing and Comparing distributions of univariate data	Visually determine clusters and gaps					
e	Density curves and the Normal Distributions	Visually determine outliers and unusual features					
m How can we recognize and use the special traits	Exploring Bivariate Data	Describe the shape of a distribution	histogram, stem plot, box and whisker plot			**Handouts:**	
b of normally distributed populations that occur in nature?		Measure center(mean, median)				**"Matching Graphs to Variables" and "Matching Statistics to Variables"**	
e How can we use linear and non-linear models to represent the		Measure spread(range, IQR, st dev)					
r relationship between two variables		Measure position(quartiles, percents, z scores	one variable Statistics (TI-83)				
		Summarize a distribution with Box and Whisker plots					
		Analyze the effects of changing units on summary measures.	Inter quartile range, outliers				
		Calculate the area under a density curve					
		Satisfy Properties/Characteristics of the Normal Distribution					
		Estimate with the Empirical Rule (68/95/99.7 Rule)	density curve			**TI-83 on a daily basis, throughout the year**	

Convert measurements (x) to standardized observations (z scores)

Reference the z table to find the proportion of observations satisfying a given condition

Analyze patterns in scatter plots

Interpret association and correlation

Model the relationship with the least squares regression line

Assess residual plots, outliers, and influential points

Transform non linear data to achieve linearity (logarithmic/power transformations)

Control the effects of lurking variables and beware extrapolation

Construct a two way table of categorical data to determine Association

Standard Normal Distribution

Empirical Rule

X, Z, Probability

normcdf(min, max, mu, sigma) (TI-83)

Association, correlation, coefficient of determination

causation, common response, confounding

least squares regression

exponential and power model

logarithmic transformation

residual analysis

Anscombe's Data Set

				influential point extrapolation Two way table Simpson's Paradox				
O	Planning a Study: Deciding what and how to measure							
c								
	Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Lessons	Resources	Standards
t	How can carefully controlled experiments result	Methods of Data Collection	Sample vs. Population	observational studies			Video:	
o	in establishing causation between two variables?	. Planning and Conducting Surveys	Statistic vs. Parameter				Mythbusters!	
b			Observational Study vs. Experiment				Towel drying vs Air Drying	
e				voluntary response and convenience samples				
r		Planning and Conducting Experiments						
			Sources of bias in surveys (Voluntary response and convenience sampling)					
			Increasing Accuracy in Surveys	simple random sample, stratified, cluster, and systematic sam ples				
			Simple Random Samples (SRS)					
			Stratified, Cluster, and Systematic Sampling	experimental design				
			Treatments, control groups, experimental units, random assignment, replication					
			Hidden Bias, confounding, placebo effect, blinding	placebo effect				
			Completely randomized design					
			Block and Matched Pairs designs	randomized comparative experiments				

			Generalizing results from observational studies and experiments					
			Random Digit Simulation	principles of experimental design: randomization, replication and control blocking and matched pairs experimental design hidden bias refusals, non adherers and dropouts statistical significance				
N	Anticipating Patterns: Producing models using probability theory							
o								
	Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Lessons	Resources	Standards
v	How can we use mathematical models to determine	. Probability	Probability as relative frequency; law of large numbers	method of exhaustion				
e	the probability of a compound event?	Discrete and Continuous Random Variables	Using the multiplication rule or exhaustion to determine a Sample Space					
m	How can we find the mean and variance of a		Union and intersection, complements, disjointedness, conditional probability, independence, and venn diagrams	sample space				
b	random variable?		Characteristics of/distinguishing between discrete and continuous random variables					
e			Probability distribution of discrete random variables	union, intersection, independent, disjoint, conditional				

r			Mean (expected value) and standard deviation of discrete random variables					
			Independent and dependent random variables	venn diagram				
			Means and standard deviations for sums and differences of independent random variables					
				discrete and continuous random variables				
				expected value				
				"pinch product"				
				rules for means and variances				
D	December							
e								
	Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Lessons	Resources	Standards
c	How can we determine if a random variable has a special distribution?	Binomial and Geometric Distributions	Criteria for the binomial and geometric distributions	binomcdf and geometcdf				
e		Sampling Distributions of the sample mean and the sample proportion	Probability distributions for binomial and geometric distributions					
m			Means and standard deviations for binomial and geometric distributions	sampling distribution				
b	What is the criteria for a binomial and geometric distribution?		Sampling distribution of a sample proportion					
e			Sampling distribution of a sample mean	CLT				
r	How does answering the question “what would happen if I did this many times” solidify our faith in statistics (with regard to the sampling distribution)?		Central Limit Theorem					
J	Statistical Inference							

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a n u a r y	How can we use confidence statements and hypothesis tests to draw conclusions about a population mean or proportion?	Confidence Intervals Tests of Significance	The meaning of a confidence interval Confidence interval for a mean Sample sizes necessary for desired margins of error Logic of significance testing, null and alternative hypotheses, p values, one and two sided tests, type I and II error, power Hypothesis test for a mean	null and alternative hypothesis (HoHa) 95% confidence statement p values critical/alpha regions type 1, type 2 error (beta)				
F e b r u a r y	How does estimating the population standard deviation affect the inference procedures for hypothesis tests and confidence intervals of means and proportions?	Special Case of Normally Distributed Data Inference for Proportion	t-distribution Single sample t-procedures Two sample (independent and matched pairs) t procedures Confidence interval for the difference between two means Significance test for the difference of two means Confidence interval for a proportion Hypothesis test for a proportion Confidence interval for a difference between two proportions Hypothesis test for a difference between two proportions	students t test degrees of freedom one samp t test, 2 samp t test				
M March								

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Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Lessons	Resources	Standards
r How can we conduct inference procedures for more	Chi Square Procedures	Chi Square test for goodness of fit/homogeneity	Chi square test				
c than 2 proportions?	Inference for Regression	Chi Square test for independence (two way tables)					
h		Hypothesis test for the slope of the least squares regression line	goodness of fit				
		Confidence interval for the slope of the least squares regression line					
			test for independence/ homogeneity				
			lin reg t test				

A April

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Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Lessons	Resources	Standards
r What test taking strategies can best prepare us	Review and Practice for the AP Exam	All skills reviewed and test taking strategies discussed				Multiple choice and Open Ended tests	
i for the AP exam?						practiced from previous	

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M Post Exam Topic:

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y How can we use an analysis of variance to	Analysis of Variance	Inference for population spread	ANOVA				
determine the relationship between more than two quantitative population		One Way analysis of variance					
parameters?			differences among means vs differences within samples				
			mean square groups				
			mean square error				