AP Statistics Course Syllabus 2017-2018

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Course Description:
AP Statistics is the high school equivalent of an introductory college statistics course. In AP Statistics, students develop strategies for the collection, organization, and analysis of data as well as how to draw conclusions from data. Students will design, administer, and tabulate results from surveys and experiments. Simulations and probability aid students in constructing models for random phenomena. Sampling distributions provide the logical structure for the study of confidence intervals and hypothesis testing. Students use a TI-83/84 graphing calculator, statistical software (Minitab), and web-based java applets to investigate statistical concepts. Students will be required to prepare written analyses of real data in order to effectively develop statistical communication skills. **All students taking the AP Statistics course are EXPECTED to take the AP Statistics Exam.**

Primary Textbook:
Yates, Moore, Starnes, Tabor. **The Practice of Statistics, Fifth Edition (For the AP Exam), 2014**

COURSE GOALS:
In AP Statistics, students are expected to learn

Skills

- To produce convincing oral and written statistical arguments, using appropriate terminology, in a variety of applied settings.
- When and how to use technology to aid them in solving statistical problems

Knowledge

- Essential techniques for producing data (surveys, experiments, observational studies), analyzing data (graphical & numerical summaries), modeling data (probability, random variables, sampling distributions), and drawing conclusions from data (inference procedures – confidence intervals and significance tests)

Habits of mind

- To become critical consumers of published statistical results by heightening their awareness of ways in which statistics can be improperly used to mislead, confuse, or distort the truth.

EVALUATION (Grading): Your grade in this course will be determined by your performance on tests, quizzes, homework, graded assignments, projects, and a final exam.

- **Tests**: Tests will be given following each chapter or, in some instances, following two chapters. The test format will reflect that of the AP Statistics Exam (Multiple-Choice and Free Response).
- **Quizzes:** There will be occasional announced and unannounced (pop) quizzes on course content.
- **Homework/Tasks/Practice/Review**: Homework will be inspected and/or collected regularly. Text assignments will generally examined for completion. Practice handouts, AP Practice/Review, and Case Studies will be graded.
- **Project:** A grading rubric will be distributed with each project. Each member of a group will earn the same grade since all are expected to do an equal amount of work.
- **Exams:** There will be a **comprehensive final exam** at the end of the course.

FINAL PROJECT: Students will be **required** to complete a project, alone or in teams, on a topic to be determined from a teacher-generated list. ***Statistical Inference*** will be the basis of the project. Students must collect and analyze data and test an appropriate hypothesis. The project data analysis must include all necessary descriptive statistics (for quantitative variables), graphical presentations, and inferential statistics. Both a written analysis and a brief oral presentation [again using the appropriate statistical vocabulary] are required for this project. This should be the bulk of our emphasis after the AP Exam.

GRADE DETERMINATION
Your grade in this course will be determined using the following criteria:

- **Informal Assessments** **30%**
  - **Daily/Homework Activities** **10%**
  - **Quiz/Practice/Review Activities** **20%**
- **Summative Assessments (Tests/Projects)** **50%**
- **Comprehensive Final Exam** **20%**

The topics in AP Statistics are divided into four major themes:

I. Exploring Data: Describing Patterns and Departure from Patterns **(20 – 30% of AP Exam)**

A. Constructing and interpreting graphical displays of distributions of univariate data (dotplot, stemplot, histogram, cumulative frequency plot)
1. Center and spread
2. Clusters and gaps
3. Outliers and other unusual features
4. Shape

B. Summarizing distributions of univariate data
1. Measuring center: median, mean
2. Measuring spread: range, interquartile range, standard deviation
3. Measuring position: quartiles, percentiles, standardized scores (*z*-scores)
4. Using boxplots
5. The effect of changing units on summary measures

C. Comparing distributions of univariate data (dotplots, back-to-back stemplots, parallel boxplots)
1. Comparing center and spread: within group, between group variation
2. Comparing clusters and gaps
3. Comparing outliers and other unusual features
4. Comparing shapes

D. Exploring bivariate data
1. Analyzing patterns in scatter plots
2. Correlation and linearity
3. Least-squares regression line
4. Residual plots, outliers, and influential points
5. Transformations to achieve linearity: logarithmic and power transformations

E. Exploring categorical data
1. Frequency tables and bar charts
2. Marginal and joint frequencies for two-way tables
3. Conditional relative frequencies and association
4. Comparing distributions using bar charts

II. Sampling and Experimentation: Planning and Conducting a Study **(10 – 15% of AP Exam)**

A. Overview of methods of data collection
1. Census
2. Sample survey
3. Experiment
4. Observational study

B. Planning and conducting surveys
1. Characteristics of a well-designed and well-conducted survey
2. Populations, samples, and random samples
3. Sources of bias in sampling and surveys
4. Sampling methods, including simple random sampling, stratified random sampling, and cluster sampling

C. Planning and conducting experiments
1. Characteristics of a well-designed and well-conducted experiment
2. Treatments, control groups, experimental units, random assignments, and replication
3. Sources of bias and confounding, including placebo effect and blinding
4. Completely randomized design
5. Randomized block design, including matched pairs design

D. Generalizability of results and types of conclusions that can be drawn from observational studies, experiments, and surveys

III. Anticipating Patterns: Exploring random phenomena using probability and simulation (20 – 30% of AP Exam)

A. Probability
1. Interpreting probability, including long-run relative frequency interpretation
2. "Law of Large Numbers" concept
3. Addition rule, multiplication rule, conditional probability, and independence
4. Discrete random variables and their probability distributions, including binomial and geometric
5. Simulation of random behavior and probability distributions
6. Mean (expected value) and standard deviation of a random variable, and linear transformations of a random variable

B. Combining independent random variables
1. Notion of independence versus dependence
2. Mean and standard deviation for sums and differences of independent random variables

C. The normal distribution
1. Properties of the normal distribution
2. Using tables of the normal distribution
3. The normal distribution as a model for measurements

D. Sampling Distributions
1. Sampling distribution of a sample proportion
2. Sampling distribution of a sample mean
3. Central Limit Theorem
4. Sampling distribution of a difference between two independent sample proportions
5. Sampling distribution of a difference between two independent sample means
6. Simulation of sampling distributions
7. *t*-distributions
8. Chi-square distribution.

IV. Statistical Inference: Estimating population parameters and testing hypotheses (30 – 40% of AP Exam)

A. Estimation
1. Estimating population parameters and margin of error
2. Properties of point estimators, including unbiasedness and variability
3. Logic of confidence intervals, meaning of confidence level and confidence intervals, and properties of confidence intervals
4. Large sample confidence interval for a proportion
5. Large sample confidence interval for a difference between proportions
6. Confidence interval for a mean
7. Confidence interval for a difference between two means (paired and unpaired)
8. Confidence interval for the slope of a least-squares regression line

B. Tests of significance
1. Logic of significance testing, null and alternate hypotheses; p-values; one- and two-sided tests; concepts of Type I and Type II errors; concept of power
2. Large sample test for a proportion
3. Large sample test for a difference between two proportions
4. Test for a mean
5. Test for a difference between two means (paired and unpaired)
6. Chi-square test for goodness of fit, homogeneity of proportions, and independence (one- and two-way tables)
7. Test for the slope of a least-squares regression line

Course Outline

Chapter 1 *Exploring Data*

Check	Topics	**Learning Objectives** Students will be able to …	Homework assignment
	Chapter 1 Introduction	• Identify the individuals and variables in a set of data. • Classify variables as categorical or quantitative.	1, 3, 5, 7, 8
	1.1 Bar Graphs and Pie Charts, Graphs: Good and Bad	• Display categorical data with a bar graph. Decide if it would be appropriate to make a pie chart. • Identify what makes some graphs of categorical data deceptive.	11, 13, 15, 17
	1.1 Two-Way Tables and Marginal Distributions, Relationships between Categorical Variables: Conditional Distributions	• Calculate and display the marginal distribution of a categorical variable from a two-way table. • Calculate and display the conditional distribution of a categorical variable for a particular value of the other categorical variable in a two-way table. • Describe the association between two categorical variables by comparing appropriate conditional distributions.	19, 21, 23, 25, 27–32
	1.2 Dotplots, Describing Shape, Comparing Distributions, Stemplots	• Make and interpret dotplots and stemplots of quantitative data. • Describe the overall pattern (shape, center, and spread) of a distribution and identify any major departures from the pattern (outliers). • Identify the shape of a distribution from a graph as roughly symmetric or skewed. • Compare distributions of quantitative data using dotplots or stemplots.	37, 39, 41, 43, 45, 47
	1.2 Histograms, Using Histograms Wisely	• Make and interpret histograms of quantitative data. • Compare distributions of quantitative data using histograms.	53, 55, 59, 60, 65, 69–74
	1.3 Measuring Center: Mean and Median, Comparing the Mean and Median, Measuring Spread: Range and *IQR*, Identifying Outliers, Five-Number Summary and Boxplots	• Calculate measures of center (mean, median). • Calculate and interpret measures of spread (range, *IQR*). • Choose the most appropriate measure of center and spread in a given setting. • Identify outliers using the 1.5×*IQR* rule. • Make and interpret boxplots of quantitative data.	79, 81, 83, 87, 89, 91, 93
	1.3 Measuring Spread: Standard Deviation, Choosing Measures of Center and Spread, Organizing a Statistics Problem	• Calculate and interpret measures of spread (standard deviation). • Choose the most appropriate measure of center and spread in a given setting. • Use appropriate graphs and numerical summaries to compare distributions of quantitative variables.	95, 97, 99, 103, 105, 107–110
	Chapter 1 Review/FRAPPY!		Chapter 1 Review Exercises
	Chapter 1 Test		

Chapter 2 ***Modeling Distributions of Data***

Check	Topics	**Learning Objectives** Students will be able to…	**Homework assignment**
	2.1 Measuring Position: Percentiles; Cumulative Relative Frequency Graphs; Measuring Position: *z*-scores	• Find and interpret the percentile of an individual value within a distribution of data. • Estimate percentiles and individual values using a cumulative relative frequency graph. • Find and interpret the standardized score (*z*-score) of an individual value within a distribution of data.	1, 3, 5, 9, 11, 13, 15
	2.1 Transforming Data	• Describe the effect of adding, subtracting, multiplying by, or dividing by a constant on the shape, center, and spread of a distribution of data.	17, 19, 21, 23, 25–30
	2.2 Density Curves, The 68–95–99.7 Rule; The Standard Normal Distribution	• Estimate the relative locations of the median and mean on a density curve. • Use the 68–95–99.7 rule to estimate areas (proportions of values) in a Normal distribution. • Use Table A or technology to find (i) the proportion of *z*-values in a specified interval, or (ii) a *z*-score from a percentile in the standard Normal distribution.	33, 35, 39, 41, 43, 45, 47, 49, 51
	2.2 Normal Distribution Calculations	• Use Table A or technology to find (i) the proportion of values in a specified interval, or (ii) the value that corresponds to a given percentile in any Normal distribution.	53, 55, 57, 59
	2.2 Assessing Normality	• Determine if a distribution of data is approximately Normal from graphical and numerical evidence.	54, 63, 65, 66, 67, 69–74
	Chapter 2 Review/FRAPPY!		Chapter 2 Review Exercises
	Chapter 2 Test		

Chapter 3 *Describing Relationships*

Check	Topics	**Learning Objectives** Students will be able to …	Homework assignment
	Chapter 3 Introduction 3.1 Explanatory and response variables, displaying relationships: scatterplots, describing scatterplots	• Identify explanatory and response variables in situations where one variable helps to explain or influences the other. • Make a scatterplot to display the relationship between two quantitative variables. • Describe the direction, form, and strength of a relationship displayed in a scatterplot and recognize outliers in a scatterplot.	1, 5, 7, 11, 13
	3.1 Measuring linear association: correlation, facts about correlation	• Interpret the correlation. • Understand the basic properties of correlation, including how the correlation is influenced by outliers. • Use technology to calculate correlation. • Explain why association does not imply causation.	14–18, 21
	3.2 Least-squares regression, interpreting a regression line, prediction, residuals	• Interpret the slope and *y* intercept of a least-squares regression line. • Use the least-squares regression line to predict *y* for a given *x*. Explain the dangers of extrapolation. • Calculate and interpret residuals.	27–32, 35, 37, 39, 41, 45
	3.2 Calculating the equation of the least-squares regression line, determining whether a linear model is appropriate: residual plots	• Explain the concept of least squares. • Determine the equation of a least-squares regression line using technology. • Construct and interpret residual plots to assess if a linear model is appropriate.	43, 47, 49, 51
	3.2 How well the line fits the data: the role of *s* and r^2 in regression	• Interpret the standard deviation of the residuals and r^2 and use these values to assess how well the least-squares regression line models the relationship between two variables.	48, 50, 55, 58
	3.2 Interpreting computer regression output, regression to the mean, correlation and regression wisdom	• Determine the equation of a least-squares regression line using computer output. • Describe how the slope, *y* intercept, standard deviation of the residuals, and r^2 are influenced by outliers. • Find the slope and *y* intercept of the least-squares regression line from the means and standard deviations of *x* and *y* and their correlation.	59, 61, 63, 65, 69, 71–78
	Chapter 3 Review/FRAPPY!		Chapter Review Exercises
	Chapter 3 Test		

AP Practice Test Chapters 1 → 3

Chapter 4 *Designing Studies*

Check	Topics	**Learning Objectives** Students will be able to…	Homework assignment
	4.1 Introduction, The Idea of a Sample Survey, How to Sample Badly, How to Sample Well: Simple Random Sampling	• Identify the population and sample in a statistical study. • Identify voluntary response samples and convenience samples. Explain how these sampling methods can lead to bias. • Describe how to obtain a random sample using slips of paper, technology, or a table of random digits.	1, 3, 5, 7, 9, 11
	4.1 Other Random Sampling Methods	• Distinguish a simple random sample from a stratified random sample or cluster sample. Give the advantages and disadvantages of each sampling method.	13, 17, 19, 21, 23, 25
	4.1 Inference for Sampling, Sample Surveys: What Can Go Wrong?	• Explain how undercoverage, nonresponse, question wording, and other aspects of a sample survey can lead to bias.	27, 29, 31, 33, 35
	4.2 Observational Study versus Experiment, The Language of Experiments	• Distinguish between an observational study and an experiment. • Explain the concept of confounding and how it limits the ability to make cause-and-effect conclusions.	37–42, 45, 47, 49, 51, 53, 55
	4.2 How to Experiment Badly, How to Experiment Well, Completely Randomized Designs	• Identify the experimental units, explanatory and response variables, and treatments. • Explain the purpose of comparison, random assignment, control, and replication in an experiment. • Describe a completely randomized design for an experiment, including how to randomly assign treatments using slips of paper, technology, or a table of random digits.	57, 59, 61, 63, 65
	4.2 Experiments: What Can Go Wrong? Inference for Experiments	• Describe the placebo effect and the purpose of blinding in an experiment. • Interpret the meaning of statistically significant in the context of an experiment.	67, 69, 71, 73
	4.2 Blocking	• Explain the purpose of blocking in an experiment. • Describe a randomized block design or a matched pairs design for an experiment.	75, 77, 79, 81, 85
	4.3 Scope of Inference, The Challenges of Establishing Causation	• Describe the scope of inference that is appropriate in a statistical study.	83, 87–94, 97–104
	4.3 Data Ethics (optional topic)	• Evaluate whether a statistical study has been carried out in an ethical manner.	
	Chapter 4 Review/FRAPPY!		Chapter 4 Review Exercises
	Chapter 4 Test		
	Cumulative AP Practice Test I		

Chapter 5 *Probability: What Are the Chances*?

Check	Topics	**Learning Objectives** Students will be able to…	**Homework assignment**
	5.1 The Idea of Probability, Myths about Randomness	• Interpret probability as a long-run relative frequency.	1, 3, 7, 9, 11
	5.1 Simulation	• Use simulation to model chance behavior.	15, 17, 19, 23, 25
	5.2 Probability Models, Basic Rules of Probability	• Determine a probability model for a chance process. • Use basic probability rules, including the complement rule and the addition rule for mutually exclusive events.	27, 31, 32, 39, 41, 43, 45, 47
	5.2 Two-Way Tables, Probability, and the General Addition Rule, Venn Diagrams and Probability	• Use a two-way table or Venn diagram to model a chance process and calculate probabilities involving two events. • Use the general addition rule to calculate probabilities.	29, 33–36, 49, 51, 53, 55
	5.3 What Is Conditional Probability?, The General Multiplication Rule and Tree Diagrams,	• Calculate and interpret conditional probabilities. • Use the general multiplication rule to calculate probabilities. • Use tree diagrams to model a chance process and calculate probabilities involving two or more events.	57–60, 63, 65, 67, 71, 73, 77, 79
	5.3 Conditional Probability and Independence: A Special Multiplication Rule	• Determine whether two events are independent. • When appropriate, use the multiplication rule for independent events to compute probabilities.	81, 83, 85, 89, 91, 93, 95, 97–99
	Chapter 5 Review/FRAPPY!		Chapter 5 Review Exercises
	Chapter 5 Test		

Chapter 6 *Random Variables*

Check	Topics	**Learning Objectives** Students will be able to…	**Homework assignment**
	Chapter 6 Introduction, 6.1 Discrete Random Variables, Mean (Expected Value) of a Discrete Random Variable	• Compute probabilities using the probability distribution of a discrete random variable. • Calculate and interpret the mean (expected value) of a discrete random variable.	1, 3, 5, 7, 9, 11, 13
	6.1 Standard Deviation (and Variance) of a Discrete Random Variable, Continuous Random Variables	• Calculate and interpret the standard deviation of a discrete random variable. • Compute probabilities using the probability distribution of a continuous random variable.	14, 15, 17, 18, 21, 23, 25
	6.2 Linear Transformations	• Describe the effects of transforming a random variable by adding or subtracting a constant and multiplying or dividing by a constant.	27–30, 35, 37, 39–41, 43, 45
	6.2 Combining Random Variables, Combining Normal Random Variables	• Find the mean and standard deviation of the sum or difference of independent random variables. • Find probabilities involving the sum or difference of independent Normal random variables.	47, 49, 51, 53, 55, 57–59, 61
	6.3 Binomial Settings and Binomial Random Variables, Binomial Probabilities	• Determine whether the conditions for using a binomial random variable are met. • Compute and interpret probabilities involving binomial distributions.	63, 65, 66, 69, 71, 73, 75, 77
	6.3 Mean and Standard Deviation of a Binomial Distribution, Binomial Distributions in Statistical Sampling	• Calculate the mean and standard deviation of a binomial random variable. Interpret these values in context.	79, 81, 83, 85, 87, 89
	6.3 Geometric Random Variables	• Find probabilities involving geometric random variables.	93, 95, 97, 99, 101–104
	Chapter 6 Review/FRAPPY!		Chapter 6 Review Exercises
	Chapter 6 Test		

AP Practice Test Chapters 4 → 6

Chapter 7 *Sampling Distributions*

Check	Topics	**Learning Objectives** Students will be able to…	**Homework assignment**
	Introduction: German Tank Problem, 7.1 Parameters and Statistics	• Distinguish between a parameter and a statistic.	1, 3, 5
	7.1 Sampling Variability, Describing Sampling Distributions	• Distinguish among the distribution of a population, the distribution of a sample, and the sampling distribution of a statistic. • Use the sampling distribution of a statistic to evaluate a claim about a parameter. • Determine whether or not a statistic is an unbiased estimator of a population parameter. • Describe the relationship between sample size and the variability of a statistic.	7, 9, 11, 13, 15, 17, 19
	7.2 The Sampling Distribution of $\hat{p}$, Using the Normal Approximation for $\hat{p}$.	• Find the mean and standard deviation of the sampling distribution of a sample proportion $\hat{p}$. Check the 10% condition before calculating $\sigma_{\hat{p}}$. • Determine if the sampling distribution of $\hat{p}$ is approximately Normal. • If appropriate, use a Normal distribution to calculate probabilities involving $\hat{p}$.	21–24, 27, 29, 33, 35, 37, 39
	7.3 The Sampling Distribution of $\overline{x}$: Mean and Standard Deviation, Sampling from a Normal Population	• Find the mean and standard deviation of the sampling distribution of a sample mean $\overline{x}$. Check the 10% condition before calculating $\sigma_{\overline{x}}$. • If appropriate, use a Normal distribution to calculate probabilities involving $\overline{x}$.	43–46, 49, 51, 53, 55
	7.3 The Central Limit Theorem	• Explain how the shape of the sampling distribution of $\overline{x}$ is affected by the shape of the population distribution and the sample size. • If appropriate, use a Normal distribution to calculate probabilities involving $\overline{x}$.	57, 59, 61, 63, 65–68
	Chapter 7 Review/FRAPPY!		Chapter 7 Review Exercises
	Chapter 7 AP Problems		
	Chapter 7 Test		
	Cumulative AP Practice Test II		

Chapter 8 ***Estimating with Confidence***

Check	Topics	**Learning objectives** Students will be able to…	**Homework assignment**
	Chapter 8 Introduction; 8.1 The Idea of a Confidence Interval, Interpreting Confidence Intervals and Confidence Levels	• Interpret a confidence interval in context. • Interpret a confidence level in context.	1, 3, 5, 7, 9
	8.1 Constructing a Confidence Interval; Using Confidence Intervals Wisely	• Determine the point estimate and margin of error from a confidence interval. • Describe how the sample size and confidence level affect the length of a confidence interval. • Explain how practical issues like nonresponse, undercoverage, and response bias can affect the interpretation of a confidence interval.	10, 11, 13, 15, 17, 19
	8.2 Conditions for Estimating *p*, Constructing a Confidence Interval for *p*, Putting It All Together: The Four-Step Process	• State and check the Random, 10%, and Large Counts conditions for constructing a confidence interval for a population proportion. • Determine critical values for calculating a *C*% confidence interval for a population proportion using a table or technology. • Construct and interpret a confidence interval for a population proportion.	20–24, 31, 33, 35, 37
	8.2 Choosing the Sample Size	• Determine the sample size required to obtain a *C*% confidence interval for a population proportion with a specified margin of error.	39, 41, 43, 45, 47
	8.3 The Problem of unknown σ, When σ Is Unknown: The *t* Distributions, Conditions for Estimating μ	• Explain how the *t* distributions are different from the standard Normal distribution and why it is necessary to use a *t* distribution when calculating a confidence interval for a population mean. • Determine critical values for calculating a *C*% confidence interval for a population mean using a table or technology. • State and check the Random, 10%, and Normal/Large Sample conditions for constructing a confidence interval for a population mean.	49–52, 55, 57, 59
	8.3 Constructing a Confidence Interval for μ, Choosing a Sample Size	• Construct and interpret a confidence interval for a population mean. • Determine the sample size required to obtain a *C*% confidence interval for a population mean with a specified margin of error.	61, 65, 69, 71, 73, 75–78
	Chapter 8 Review/FRAPPY!		Chapter 8 Review Exercises
	Chapter 8 Test		

Chapter 9 *Testing a Claim*

Check	Topics	**Learning Objectives** Students will be able to…	**Homework assignment**
	9.1 Stating Hypotheses, The Reasoning of Significance Tests, Interpreting *P*-values, Statistical Significance	• State the null and alternative hypotheses for a significance test about a population parameter. • Interpret a *P*-value in context. • Determine if the results of a study are statistically significant and draw an appropriate conclusion using a significance level.	1, 3, 5, 7, 9, 11, 15
	9.1 Type I and Type II Errors	• Interpret a Type I and a Type II error in context, and give a consequence of each.	13, 17, 19, 21, 23
	9.2 Carrying Out a Significance Test, The One-Sample *z* Test for a Proportion	• State and check the Random, 10%, and Large Counts conditions for performing a significance test about a population proportion. • Perform a significance test about a population proportion.	25–28, 31, 35, 39, 41
	9.2 Two-Sided Tests, Why Confidence Intervals Give More Information, Type II Error and the Power of a Test	• Use a confidence interval to draw a conclusion for a two-sided test about a population parameter. • Interpret the power of a test and describe what factors affect the power of a test. • Describe the relationship among the probability of a Type I error (significance level), the probability of a Type II error, and the power of a test.	43, 45, 47, 51, 53, 55, 57
	9.3 Carrying Out a Significance Test for μ, The One Sample *t* Test, Two-Sided Tests and Confidence Intervals	• State and check the Random, 10%, and Normal/Large Sample conditions for performing a significance test about a population mean. • Perform a significance test about a population mean. • Use a confidence interval to draw a conclusion for a two-sided test about a population parameter.	59–62, 65, 69, 73, 77, 79
	9.3 Inference for Means: Paired Data, Using Tests Wisely	• Perform a significance test about a mean difference using paired data.	83, 85, 87, 89–91, 93, 95–102
	Chapter 9 Review/FRAPPY!		Chapter 9 Review Exercises
	Chapter 9 AP Problems		
	Chapter 9 Test		

AP Practice Test Chapters 7 → 9

Chapter 10 ***Comparing Two Populations or Groups***

Check	Topics	**Learning Objectives** Students will be able to…	**Homework assignment**
	"Is Yawning Contagious?" Activity, 10.1 The Sampling Distribution of a Difference between Two Proportions	• Describe the shape, center, and spread of the sampling distribution of $\hat{p}_1 - \hat{p}_2$.	1, 3
	10.1 Confidence Intervals for $p_1 - p_2$	• Determine whether the conditions are met for doing inference about $p_1 - p_2$. • Construct and interpret a confidence interval to compare two proportions.	5, 7, 9, 11
	10.1 Significance Tests for $p_1 - p_2$, Inference for Experiments	• Perform a significance test to compare two proportions.	13, 15, 17, 21, 23
	10.2 "Does Polyester Decay?" Activity, The Sampling Distribution of a Difference between Two Means	• Describe the shape, center, and spread of the sampling distribution of $\overline{x}_1 - \overline{x}_2$. • Determine whether the conditions are met for doing inference about $\mu_1 - \mu_2$.	31, 33, 35, 51
	10.2 The Two-Sample *t* Statistic, Confidence Intervals for $\mu_1 - \mu_2$	• Construct and interpret a confidence interval to compare two means.	25–28, 37, 39
	10.2 Significance Tests for $\mu_1 - \mu_2$, Using Two-Sample *t* Procedures Wisely	• Perform a significance test to compare two means. • Determine when it is appropriate to use two-sample *t* procedures versus paired *t* procedures.	41, 43, 45, 47, 53, 57–60
	FRAPPY! Page 662 Chapter 10 Review		Chapter 10 Review Exercises
	Chapter 10 Test		
	Cumulative AP Practice Test III		

Chapter 11 ***Inference for Distributions of Categorical Data***

Check	Topics	**Learning objectives** Students will be able to…	Homework assignment
	Activity: The Candy Man Can; 11.1 Comparing Observed and Expected Counts: The Chi-Square Statistic; The Chi-Square Distributions and *P*-values	• State appropriate hypotheses and compute expected counts for a chi-square test for goodness of fit. • Calculate the chi-square statistic, degrees of freedom, and *P*-value for a chi-square test for goodness of fit.	1, 3, 5
	11.1 Carrying Out a Test; Follow-Up Analysis	• Perform a chi-square test for goodness of fit. • Conduct a follow-up analysis when the results of a chi-square test are statistically significant.	7, 9, 11, 15, 17
	11.2 Comparing Distributions of a Categorical Variable; Expected Counts and the Chi-Square Statistic; The Chi-Square Test for Homogeneity	• Compare conditional distributions for data in a two-way table. • State appropriate hypotheses and compute expected counts for a chi-square test based on data in a two-way table. • Calculate the chi-square statistic, degrees of freedom, and *P*-value for a chi-square test based on data in a two-way table. • Perform a chi-square test for homogeneity.	19–22, 27, 29, 31, 33, 35, 37, 39
	11.2 Relationships between Two Categorical Variables; the Chi-Square Test for Independence; Using Chi-Square Tests Wisely	• Perform a chi-square test for independence. • Choose the appropriate chi-square test.	41, 43, 45, 47, 49, 51–55
	Chapter 11 Review/ FRAPPY!		Chapter 11 Review Exercises
	Chapter 11 Test		

AP Practice Test Chapters 10 → 11

Chapter 12 ***More About Regression***

Check	Topics	**Learning Objectives** Students will be able to …	**Homework assignment**
	Activity: The Helicopter Experiment; 12.1 Sampling Distribution of *b*; Conditions for Regression Inference	• Check the conditions for performing inference about the slope β of the population (true) regression line.	1, 3
	12.1 Estimating the Parameters; Constructing a Confidence Interval for the Slope	• Interpret the values of *a*, *b*, *s*, SE_b, and r^2 in context, and determine these values from computer output. • Construct and interpret a confidence interval for the slope β of the population (true) regression line.	5, 7, 9, 11
	12.1 Performing a Significance Test for the Slope	• Perform a significance test about the slope β of the population (true) regression line.	13, 15, 17
	12.2 Transforming with Powers and Roots	• Use transformations involving powers and roots to find a power model that describes the relationship between two variables, and use the model to make predictions.	19–24, 31, 33
	12.2 Transforming with Logarithms; Putting it all Together: Which Transformation Should We Choose?	• Use transformations involving logarithms to find a power model or an exponential model that describes the relationship between two variables, and use the model to make predictions. • Determine which of several transformations does a better job of producing a linear relationship.	35, 37, 39, 41, 43, 45, 47–50
	Chapter 12 Review/ FRAPPY!		Chapter 12 Review Exercises
	Chapter 12 AP Problems		
	Chapter 12 Test		
	Cumulative AP Practice Test IV		