AP® Statistics

About the Advanced Placement Program® (AP®)

The Advanced Placement Program® has enabled millions of students to take college-level courses and earn college credit, advanced placement, or both, while still in high school. AP Exams are given each year in May. Students who earn a qualifying score on an AP Exam are typically eligible, in college, to receive credit, placement into advanced courses, or both. Every aspect of AP course and exam development is the result of collaboration between AP teachers and college faculty. They work together to develop AP courses and exams, set scoring standards, and score the exams. College faculty review every AP teacher's course syllabus.

AP Statistics Course Overview

The AP Statistics course introduces students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. There are four themes evident in the content, skills, and assessment in the AP Statistics course: exploring data, sampling and experimentation, probability and simulation, and statistical inference. Students use technology, investigations, problem solving, and writing as they build conceptual understanding.

The AP Statistics course is equivalent to a one-semester, introductory, non-calculus-based college course in statistics.

PREREQUISITES

The AP Statistics course is an excellent option for any secondary school student who has successfully completed a second-year course in algebra and who possesses sufficient mathematical maturity and quantitative reasoning ability. Because second-year algebra is the prerequisite course, AP Statistics is usually taken in either the junior or senior year.

AP Statistics Course Content

The course content is organized into nine commonly taught units, which have been arranged in the following suggested, logical sequence:

- **Unit 1:** Exploring One-Variable Data
- **Unit 2:** Exploring Two-Variable Data
- **Unit 3:** Collecting Data
- **Unit 4:** Probability, Random Variables, and Probability Distributions
- **Unit 5:** Sampling Distributions
- **Unit 6:** Inference for Categorical Data: Proportions
- **Unit 7:** Inference for Quantitative Data: Means
- **Unit 8:** Inference for Categorical Data: Chi-Square
- **Unit 9:** Inference for Quantitative Data: Slopes

Each unit is broken down into teachable segments called topics.

In addition, the following big ideas serve as the foundation of the course, enabling students to create meaningful connections among concepts and develop deeper conceptual understanding:

- **Variation and Distribution:** The distribution of measures for individuals within a sample or population describes variation. The value of a statistic varies from sample to sample. How can we determine whether differences between measures represent random variation or meaningful distinctions? Statistical methods based on probabilistic reasoning provide the basis for shared understandings about variation and about the likelihood that variation between and among measures, samples, and populations is random or meaningful.

- **Patterns and Uncertainty:** Statistical tools allow us to represent and describe patterns in data and to classify departures from patterns. Simulation and probabilistic reasoning allow us to anticipate patterns in data and to determine the likelihood of errors in inference.

- **Data-Based Predictions, Decisions, and Conclusions:** Data-based regression models describe relationships between variables and are a tool for making predictions for values of a response variable. Collecting data using random sampling or randomized experimental design means that findings may be generalized to the part of the population from which the selection was made. Statistical inference allows us to make data-based decisions.

AP Statistics Course Skills

Students should develop course skills in the following skills categories:

- **Selecting Statistical Methods:** Select methods for collecting and/or analyzing data for statistical inference.
- **Data Analysis:** Describe patterns, trends, associations, and relationships in data.
- **Using Probability and Simulation:** Explore random phenomena.
- **Statistical Argumentation:** Develop an explanation or justify a conclusion using evidence from data, definitions, or statistical inference.

AP STATISTICS EXAM: 3 HOURS

Assessment Overview

The AP Statistics Exam assesses student understanding of the skills and learning objectives outlined in the course framework. The exam is 3 hours long and includes 40 multiple-choice questions and 6 free-response questions.

Format of Assessment

Section I: Multiple-choice | 40 Questions | 90 Minutes | 50% of Exam Score

- All four skill categories are assessed.

Section II: Free-response | 6 Questions | 90 Minutes | 50% of Exam Score

- Part A: Questions 1–5 (**37.5% of Exam Score**).
- Part B: Question 6: Investigative task (**12.5% of Exam Score**).

Exam Components

Sample Multiple-Choice Question

EXPERIMENTAL DESIGN

An independent polling agency was hired to track the preferences of registered voters in a district for an upcoming election. The polling agency divided the district into twenty regions and believes that the regions are similar to one another in their composition. The agency then randomly selected two of the regions and surveyed all registered voters in both regions.

Which of the following best describes the sampling method used by the polling agency?

(A) Convenience sampling

(B) Simple random sampling

(C) Stratified random sampling

(D) Systematic sampling

(E) Cluster sampling

Correct Answer: E

Sample Free-Response Question: Multi-Focus

A geologist studying lead concentration in soil selected random samples of soil from two regions: region A and region B. The following histograms show the distribution of lead concentration, in parts per million (ppm), for the two samples.
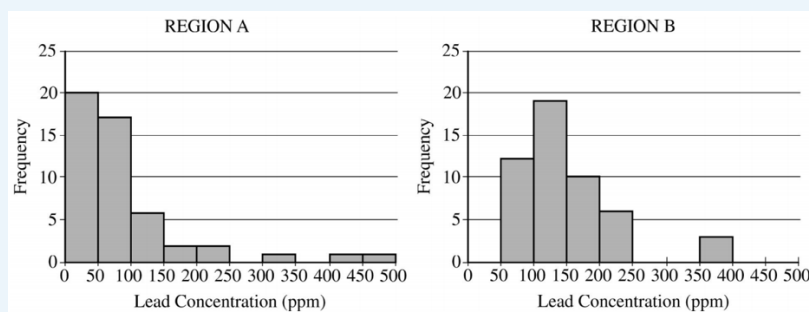
(A) Write a few sentences comparing the distributions of lead concentration in the two samples.

(B) To investigate whether the mean lead concentration is different in region A than in region B, the geologist conducted the appropriate test. All conditions for inference are met, and the p-value of the test is 0.007. Based on the p-value, is there convincing statistical evidence, at a level of significance of $\alpha = 0.05$, that there is a difference between the mean lead concentration of region A and the mean lead concentration of region B? Justify your answer.