AP Statistics vs. AP Calculus

Soon you will have to decide whether you want to take AP Statistics or AP Calculus. Wouldn't it be nice to know what these things are?

What is AP Statistics? (borrowed/adapted from the College Board website)

Statistics is the most widely applicable branch of mathematics. It is used by more people than any other kind of math. You'll never wonder when you'll ever use this stuff!

Everyone who needs to collect and analyze data needs to understand statistics. That's every branch of science, of course. And it's also important in the social sciences (like psychology, sociology, anthropology), in business and economics, in political science and government, in law, and in medicine. There is a very strong chance YOU will use statistics in college and in your career.

This is a class equivalent to a one-semester, introductory, non-calculus-based, college course in statistics. In AP Statistics, you will be introduced to the major concepts and tools for collecting, analyzing and drawing conclusions from data through four broad themes:

1. Exploring Data: Describing patterns and departures from patterns.

We will collect and examine data to see if patterns emerge. We will gather real data as well as use real world data sets to illustrate concepts throughout the year.

2. Sampling and Experimentation: Planning and conducting a study.

We will design experiments to draw conclusions that can be generalized about the population you are curious about. We will need to interpret your conclusions to determine if they are meaningful.

3. Anticipating Patterns: Exploring random phenomena using probability and simulation.

We will learn to anticipate patterns, through simulations to model situations, and make a prediction from those patterns.

4. Statistical Inference: Estimating population parameters and testing hypotheses.

We will learn what can be generalized about the population and how to investigate research questions that can help with those generalizations.

What is AP Calculus? (borrowed/adapted from the college board website)

Terra Linda High School offers the AP Calculus AB course.

Calculus is the study of change and rates of change. What is the instantaneous velocity of a rocket? How can I predict what the stock market will do given certain conditions based on my graphical model? I need to make a container holding a certain volume, and I want a certain shape. How can I use calculus to test things out before I set the machine specifications? How does the calculator actually calculate sine of an angle?

Who uses calculus?

Credit card companies use calculus to set the minimum payments due on credit card statements at the exact time the statement is processed by considering multiple variables such as changing interest rates and a fluctuating available balance.

Biologists use differential calculus to determine the exact rate of growth in a bacterial culture when different variables such as temperature and food source are changed. This research can help increase the rate of growth of necessary bacteria, or decrease the rate of growth for harmful and potentially threatening bacteria.

An architect will use integration to determine the amount of materials necessary to construct a curved dome over a new sports arena, as well as calculate the weight of that dome and determine the type of support structure required.

A physicist uses calculus to find the center of mass of a sports utility vehicle to design appropriate safety features that must adhere to federal specifications on different road surfaces and at different speeds.

A graphic artist uses calculus to determine how different three-dimensional models will behave when subjected to rapidly changing conditions. This can create a realistic environment for movies or video games.

AP STATISTICS - SAMPLE PROBLEMS

1. A newspaper advertisement for *USA Today: The Television Show* once said: *Should handgun control be tougher? You call the shots in a special call-in poll tonight. If yes, call 1-900-720-6181. If no, call 1-900-720-6182. Charge is 50 cents for the first minute.*

Explain why this opinion poll is almost certainly biased.

2. An auto analyst is conducting a satisfaction survey, sampling from a list of 10,000 new car buyers. The list includes 2,500 Ford buyers, 2,500 GM buyers, 2,500 Honda buyers, and 2,500 Toyota buyers. The analyst selects a sample of 400 car buyers, by randomly sampling 100 buyers of each brand.

Is this an example of a simple random sample?

3. Bob is a high school basketball player. He is a 70% free throw shooter. That means his probability of making a free throw is 0.70. What is the probability that Bob makes his first free throw on his fifth shot?

4. The Acme Car Company claims that at most 8% of its new cars have a manufacturing defect. A quality control inspector randomly selects 300 new cars and finds that 33 have a defect. Should she reject the 8% claim?

AP CALCULUS – SAMPLE PROBLEMS

1. A cylindrical swimming pool is being filled from a fire hose at a rate of 5 cubic feet per second. If the pool is 40 feet across, how fast is the water level increasing when the pool is half full?

2. The cost of fuel to propel a boat through the water (in dollars per hour) is proportional to the cube of the speed. A certain ferry boat uses $100 worth of fuel per hour when cruising at 10 miles per hour. Apart from fuel, the cost of running this ferry (labor maintenance, and so on) is $675 per hour. At what speed should it travel so as to minimize the cost per mile traveled?

3. As a pot of tea cools, the temperature of the tea is modeled by a differentiable function H for certain values of time, and temperature measured in degrees Celsius. Values of H(t) at selected values of time t are shown in the table above.

 (a) Use the data in the table to approximate the rate at which the temperature of the tea is changing at time t = 3.5. Show the computations that lead to your answer.

(b) Using correct units, explain the meaning of the expression in the context of this problem.

(d) At time t = 0, biscuits with temperature 100 were removed from an oven. The temperature of the biscuits at time t is modeled by a differentiable function B for which it is known that….at time t = 10, how much cooler are the biscuits than the tea?

To sum it up…the difference between AP Statistics and AP Calculus is…

AP Statistics
Collecting and analyzing data
Computation de-emphasized
Focus on communication and interpretation
Students learn to write using technical   language
Design experiments and surveys

Calculator Used: TI-84

AP Calculus
Graphical, numerical and algebraic
Builds on precalculus concepts
Computational proficiency helps
Emphasizes techniques and applications

Calculator Used: TI-84

Can't decide? Really like math? Take both statistics and calculus!