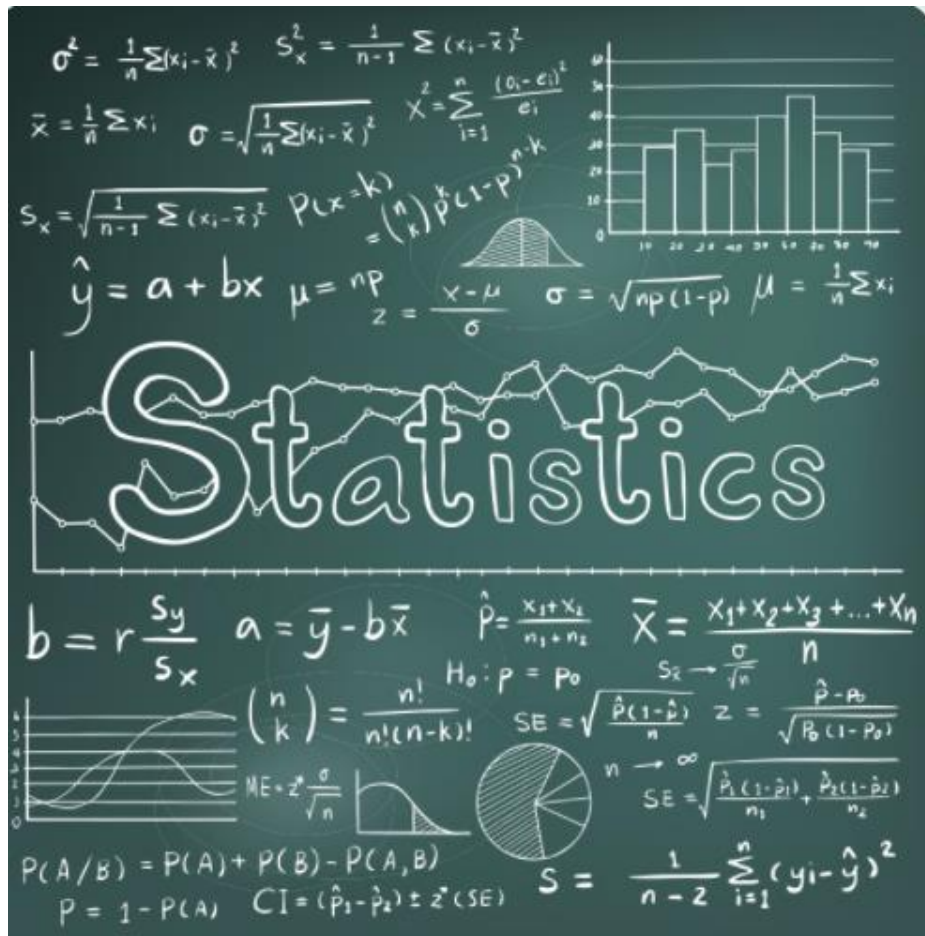# AP Statistics
Summer Assignment

Welcome to **AP Statistics**! This review assignment is designed to refresh your math skills. It includes information that was taught in previous courses and will be used throughout the upcoming school year. As you prepare, you may need to seek help by accessing the suggested resources or links provided. This course is different than any other math class you have ever taken!

IMPORTANT: Read this page first...

INSTRUCTIONS:

1. Complete all sections and problems in this packet on your own.
2. You must be competent in basic algebra, and you must be willing to explain your answers. Simply getting the correct numerical answer WILL NOT be sufficient for this course.
3. It is preferable that you own a TI-84 or TI-NSPIRE calculator. If you cannot purchase your own calculator, one will be loaned to you by the school.
4. Remember this is an AP Course. Do not expect this to be an "easy course." Let me reiterate: THIS IS NOT AN EASY COURSE! Although it may not seem as difficult computationally as other higher math courses, **it requires a great deal of outside reading** and homework, and it requires a thorough understanding of many abstract concepts. As such, you must read the [AP Statistics Summer Assignment Required Reading](#) and take notes in order to answer the questions that follow and be prepared for the assessment. Going forward, you must keep up with the pace of the class and seek additional help after school as needed.

PACING: You should pace yourself to work on this assignment at least a few hours a week leading up to the start of school in September. If you complete the packet at the end of June or early in July, it will not be very helpful in preparation for the start of school. Also, it will not be helpful if you try to complete the entire packet a night or two before school starts. Pace yourself by setting a calendar reminder and scheduling blocks of time to focus on this assignment as you prepare to return to school in September.

GRADING:

- On the first day of school, your math teacher will check for full completion of this Summer Assignment and the supporting work for your responses (no work = no credit). This part will be weighted at 50% - this is the grade that represents your effort and following of directions.
- Your teacher will then review the assignment and provide remediation as needed.
- Upon completion of your teacher's review, you will be given an assessment (a "test") based on the topics covered in this assignment. This assessment will be weighted at 50% - this is the grade that represents your mastery of the skills.
- The two weighted scores combined will count as one Project grade for the 1st trimester.
- Acceptance of late assignments will be limited and subject to point deductions.

We are looking forward to meeting you in September. Go Bulldogs!

AP STATISTICS SUMMER ASSIGNMENT

RESOURCES & REFERENCE MATERIALS:

If you need additional online resources to complete this assignment, you can visit www.stattrek.com. On the left-hand side of the page there is a BROWSE box. Click on AP Statistics under the TUTORIALS heading.

The textbook is another good resource. The text we are using is only available online. To access online you will need to create a WebAssign Account. **More on this the first day of class.**

AP STATISTICS SUMMER ASSIGNMENT

INSTRUCTIONS:
The following questions are in a True/False format. The answers to these questions will frequently depend on remembering facts, understanding of the concepts, and knowing the statistical vocabulary. Before answering these questions, be sure to read them carefully!

1. The entire collection of individuals or objects about which information is desired is called a sample.
  a) True
  b) False

2. Methods for summarizing data make up the branch of statistics called inferential statistics.
  a) True
  b) False

3. A primary use of inferential statistics is to make generalizations from a sample to a population.
  a) True
  b) False

4. A data set is discrete if the possible values are isolated points on the number line.
  a) True
  b) False

5. Frequency distributions can only be used with categorical data.
  a) True
  b) False

6. The relative frequency for a particular category is the number of times the category appears in the data.
  a) True
  b) False

7. Dotplots work best for small and moderate sized numerical data sets.
  a) True
  b) False

8. Bar charts should be used with categorical data.
  a) True
  b) False

9. A data set consisting of many observations of a single characteristic is a categorical data set.
  a) True
  b) False

10. A data set is multivariate if it consists only of numeric variables.
  a) True
 b) False

AP STATISTICS SUMMER ASSIGNMENT

11. Briefly describe how populations and samples differ.

12. In a psychological study of distance perception, introductory psychology class volunteers were given 5, 10, or 15 extra credit points depending on their level of participation in the experiment. They walked along paths laid out along hallways in the psychology building, and were asked to judge the distance they had walked. Each path distance was between 100 and 200 feet in length, and contained from two to seven 90 degree turns. The investigators also kept track of class standing (freshman, sophomore, junior, or senior). For each of the variables in this study, determine whether it is categorical or numerical. For each numerical variable, determine whether it is discrete or continuous:

(a)   The true length of the path

(b)   The amount of credit given to the volunteers

(c)   The length of the path as judged by the students

(d)   The number of 90 degree turns

(e)   Class standing

AP STATISTICS SUMMER ASSIGNMENT

13. The most important right and responsibility of citizens in a democratic society is voting. The bar chart below shows, for different age groups in the 2000 presidential election in the United States, the percentage of individuals in that age group who are registered to vote.
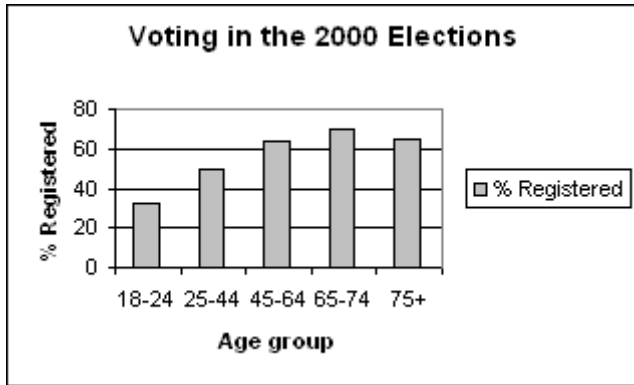
(a)   Describe in a few sentences the registration pattern that you see in the data above.

(b)   Some individuals argue that the reason for the current level of registration in the 18-24 year-old group is that many of them are college students and would have to vote absentee. In your opinion, would that explain the registration level for the 18 - 24 age-group? Why or why not?

AP STATISTICS SUMMER ASSIGNMENT

14. Artificial nest have often been used when biologists study predation on birds. It is usually assumed that predators will respond to artificial nests in the same way they do to real birds' nests. A recent experiment was performed to check this assumption for predators of the American robin (*Turdus migratorius*) by comparing the egg loss in three experimental treatments: (1) natural robin's nests, (2) artificial wicker-basket nests placed 30 meters in a random direction from natural robin's nests, and (3) artificial wicker-basket nests placed in a 180 m by 240 m grid around robin's nests. The data below are <u>cumulative</u> counts of eggs predated (stolen or broken and eaten) at 5, 10, and 15 day points of the experiment.

Cumulative count of depredated eggs

Nest type	Original *n*	Day 5 check	Day 10 check	Day 15 check
Natural robin	27	12	17	19
30 m from robin	27	3	12	18
Grid	48	7	32	44

(a) Construct a <u>bar chart</u> to display the cumulative counts for the natural robin nests at their 5-, 10-, and 15-day checks.

(b) Fill in the <u>relative</u> frequency distribution (table) representing the cumulative counts for the artificial nests in the <u>grid</u>. (Do not convert the table to a graph.)

Nest type	Original *n*	Day 5 check	Day 10 check	Day 15 check
Natural robin	27			
30 m from robin	27			
Grid	48			

AP STATISTICS SUMMER ASSIGNMENT

15. Biologists know that bats have different flight characteristics. Some bats exhibit fast, straight, and long flights; others are moderately slow, and highly maneuverable. The flight capabilities of bats are presumably a function of (a) the characteristics of the bat wings, and (b) the laws of physics. The data presented below are wing weights in grams for certain species of bats from Nicaragua and Costa Rica. Two categories of bat species are represented: fruit-eaters and insect-eaters.

Fruit eaters:
9.9, 11.5, 47.0, 59.6, 18.2, 22.1, 22.9, 15.0, 15.4, 13.3, 38.3, 42.2, 114.3, 105.4, 80.9

Insect eaters:
23.8, 16.1, 4.2, 3.9, 7.5, 3.5, 3.9

   a) Construct two dot plots that will allow you to easily compare the distributions of the
       wing weights for the two categories of bats, fruit-eaters and insect-eaters.

   b) Write a short paragraph describing the features of the two plots; what do these
       plots tell you about the differences in wing weight for fruit- and insect-eaters?

AP STATISTICS SUMMER ASSIGNMENT

16. Briefly describe how inferential and descriptive statistics differ.

17. In a study of how college students give directions from maps, 40 Introductory Psychology volunteers, 20 men and 20 women, were given the task of giving directions to another. Observations were made of subjects' direction-giving behavior in the experiment:

(a) whether the map was available, or the directions were given from memory,
(b) the sex of the direction giver,
(c) the distances given as part of the directions,
(d) the number of times directions such as North, Southwest, etc. were used, and
(e) the frequency of errors in the directions

For each of the variables in this experiment, determine whether it is categorical or numerical. For each numerical variable, determine whether it is discrete or continuous:

(a) whether the map was available, or the directions were given from memory
(b) the sex of the direction giver
(c) the distances given as part of the directions
(d) the number of times directions such as North, Southwest, etc. were used
(e) Frequency of errors in the directions

AP STATISTICS SUMMER ASSIGNMENT

18. The most important right and responsibility of citizens in a democratic society is voting. The bar chart below shows, for different age groups in the 2000 presidential election in the United States, the percentage of individuals in that age group who actually voted.
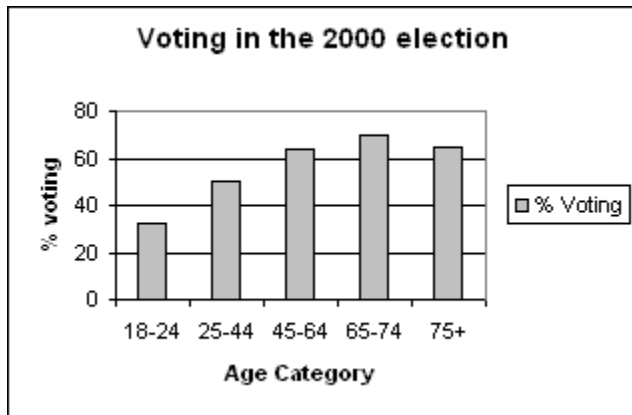
(a) Describe in a few sentences the voting pattern that you see in the data above.

(b) Some individuals argue that the reason for the current level of voting in the 18-24 year-old group is that many of them are college students and have to vote absentee. In your opinion, why would that affect the voting percentage for the 18 - 24 age-group?

AP STATISTICS SUMMER ASSIGNMENT

19. Bird-plane collisions

Collisions between birds and airplanes are a major problem, threatening passenger safety and resulting in costly repairs. During the years 1990 - 1994, researchers gathered bird remains from runways at Lihue Airport on the island of Kauai, Hawaii. The data below are counts of birds found on the runway used for takeoffs and the runway used for landings from the 4 most frequently involved species:

Species	Takeoff	Landing
Zebra dove	49	68
Mannikin spp.	33	82
Plover	29	51
Barn-owl	6	39

(a)   Construct a bar chart to display the bird species data for the landing runway.

(b)   Construct a relative frequency distribution (table) representing the bird species data for the takeoff runway.

20. Bat characteristics

Biologists know that bats have different flight characteristics. Some bats exhibit fast, straight, and long flights; others are moderately slow, and highly maneuverable. The flight capabilities of bats are presumably a function of (a) the characteristics of the bat wings, and (b) the laws of physics. The data presented below are wing spans in centimeters for certain species of bats from Nicaragua and Costa Rica. Two categories of bat species are represented: fruit-eaters and insect-eaters.

Fruit eaters:
25.2, 27.2, 42.0, 44.8, 31.3, 32.5, 32.0, 28.1, 30.7, 27.0, 41.1, 41.6, 58.4, 58.7, 53.9

Insect eaters:
32.8, 27.4, 21.0, 23.9, 27.5, 22.4, 18.7

a) Construct two dot plots that will allow you to easily compare the distributions of the wing spans for the two categories of bats, fruit-eaters and insect-eaters.

b) Write a short paragraph describing the features of the two plots; what do these plots tell you about the differences in wing span for fruit- and insect-eaters?