

## AP Statistics Summer Assignment Summer of 2026

**Description:** AP Statistics is a challenging course. This class is a college-level Statistics course and also prepares students for the AP Statistics exam in May which can be used to earn college credit. Due to the rigor of the class, students must have a strong background in math and come to each class with all assignments completed. *Please note* that simply “finding the answer” is not enough for this course. You must be able to justify and explain your results and apply them to the problem in general.

**Due Date:** This assignment is due on or before August 26, 2026.

**N.B. All work should be typed, double-spaced, using good grammar, spelling, etc. Communication is key to success in statistics. Responses should be in paragraph form and suitable for any writing assignment in English or Social Studies class – do not just answer the questions briefly with bullet points.**

### **Part 1: *Why Statistics?***

Write a page explaining why high school students should take a statistics class. First, use evidence from the following sources to make your case:

- [Teach Statistics Before Calculus](https://bit.ly/3xrsjyt) (https://bit.ly/3xrsjyt)
- [Statistics Instruction on the Rise](https://bit.ly/3zpENrA) (https://bit.ly/3zpENrA)

Then, write a paragraph explaining what you hope to gain from taking a class in Statistics. What are your reasons for signing up for this class?

### **Part 2: “A book is, in fact, less a cause of intelligence than an indicator.”**

Go to the “**Hidden Brain**” website (<https://hiddenbrain.org/>) and listen to a recent episode that sounds interesting to you. *Be sure to listen to an entire episode, not a clip* – episodes are **more** than 30 minutes long. Honestly, the newest episodes are longer than the old ones. Feel free to search the archives.

Tip: Listen as you drive or clean or go for a walk.

My favorite episode is “[What’s Not on the Test: The Overlooked Factors that Determine Success](#)” (it’s an old one)

- **Begin your response by the full name of the episode and the date it originally aired.**
- **Fully** summarize the theme of the episode in your own words as well as the individual studies discussed.
  - What were the questions the researchers asked?
  - How did they try to answer those questions?
  - What did they find?
- What are your personal thoughts on the topic? What did you learn from this episode that changed and/or added to what you previously thought you knew?

### Part 3: *"The information has been set loose."*

1. Read the attached article, "Cracking the Real Estate Code" and complete the following:
  - Summarize the article's findings. Be sure to describe how the realtor uses her "information advantage" to her benefit and describe another example from the world around you where you see this occurring. Has this advantage changed due to 21<sup>st</sup>-century technology? If so, how?
2. On the **Hidden Brain** website, find the episode entitled [The Scientific Process from May 24, 2016](#) (Click on the link or Google "Hidden Brain Scientific Process") where "expert information" is somewhat debunked. Summarize the episode and provide a personal response.

### Part 4: *Interesting Data*

Examining data is an important part of understanding the world, but few things are harder than making meaning from a list of numbers. Fortunately, many groups and individuals are working to find new ways to display data in useful and interesting ways. I want to make sure that you know about two of them before you start the new school year.

1. **Gapminder.com** is an organization that is working hard to make the world's data accessible. To understand the use and importance of Gapminder, view the following 20-minute presentation - [The Best Stats You've Ever Seen](#) (<https://bit.ly/3aAzpYs>)
  - a. Explore the website - Gapminder.org.
    - i. When you land on the homepage, scroll down a little. You will see Worldview Upgrader, Animating Data and Dollar Street. They are all AWESOME and very interesting.
    - ii. For now, Click **Animating Data**.
      1. You can change the x- and y-axes to be a wide variety of variables. Play around and find two that you think are related or are interesting in some way to you. Hover your mouse over each dot to see which country it is.
      2. There is a link at the top called "How to Use" if you are confused.
  - b. Once you have created a graph that is interesting to you, find the Share links in the upper-right corner and click the button that looks like a paper airplane. Copy the shortcut link to the top of your summary.
  - c. **Write a short summary of what you graphed, what question it answers, and any trends or patterns you see in the data.**
  - d. An example summary and link is attached.
2. **Worldmapper.org** creates maps of the world where the size of the country represents the value of the data. Click "Browse Maps" and explore the website (topics and subtopics on left side) to find two maps that seem related to you and then write a short summary comparing and contrasting the two maps. Right-click on the maps to copy the images, then paste them into your summary. Include the map numbers in your summary.
  - a. An example summary is attached.

## PART 3

### Cracking the Real Estate Code

Is your agent really working for the enemy? A user's guide to home economics (and how to beat the expert industry).

By Steven D. Levitt and Stephen J. Dubner

**It's one of the biggest** bets you can place on another person: You hire a real estate agent to sell your home.

She sizes up its charms, snaps some pictures, sets the price, writes a seductive ad, shows the house aggressively, negotiates the offers, and sees the deal through to the end. Sure, it's a lot of work, but she's getting a nice cut. On the sale of a \$300,000 house, you'll typically pay a 6 percent agent fee of \$18,000. That's a lot of money. But you tell yourself that you never could have sold the house for \$300,000 on your own. The agent knew how to - what's that phrase she used? - "maximize the house's value." She got you top dollar, right?

A real estate agent is every bit the expert. She is better informed than you about your home's worth, the state of the housing market, even the buyer's frame of mind. You depend on her for this information.

As the world has grown more specialized, countless such experts have made themselves similarly indispensable. Doctors, lawyers, contractors, auto mechanics: They all enjoy informational advantage. And they use that advantage to help you.

Right?

**Information can be** a beacon, or information can be a cudgel; it depends on who wields it and how. In any transaction, it's common for one party to have better information than the other. In the parlance of economists, this is information asymmetry. There's value in asymmetry; it's the reason why someone, such as a consumer, will pay someone else, an expert, for his knowledge.

Of course, sometimes an expert might manipulate his advantage for his own benefit. If your doctor suggests that you have an angioplasty - even though current research suggests that angioplasty often does little to prevent heart attacks - your first thought won't likely be that the doctor is using his informational advantage to make a few thousand dollars for himself or his buddy. But as David Hillis, an interventional cardiologist at the University of Texas Southwestern Medical Center in Dallas, explained to *The New York Times*, a doctor may have the same economic incentives as a car salesman or a funeral director or a mutual fund manager: "If

you're an invasive cardiologist and Joe Smith, the local internist, is sending you patients, and if you tell them they don't need the procedure, pretty soon Joe Smith doesn't send patients anymore."

Or consider these findings of a 1996 medical study: Obstetricians in areas with declining birthrates are much more likely to perform cesarean section deliveries than obstetricians in growing areas - suggesting that when business is tough, doctors may try to ring up more expensive procedures.

The Internet, of course, is all about smoothing over these asymmetries; in one industry after another, from life insurance to used cars, the Web has eliminated the expert's upper hand by giving once-exclusive information to the online masses. But some industries have been slow to change - real estate among them.

The best way to observe information asymmetry at work is to measure how an expert treats you versus how he performs the same service for himself. Real estate provides the perfect opportunity, since housing sales are a matter of public record, and real estate agents often do sell their own homes. Recent data covering the sale of nearly 100,000 houses in suburban Chicago show that more than 3,000 of those houses were owned by agents.

Before plunging into the data, a question: What is the agent's incentive when selling her own home? Simple: to make the best deal possible. Presumably, this is also her incentive when selling your home; after all, her commission is based on the sale price. And so your incentive and the agent's incentive would seem to be nicely aligned. But commissions aren't as simple as they seem. First of all, a 6 percent commission is typically split between the seller's agent and the buyer's. Each agent then kicks back half of her take to her agency. Which means that only 1.5 percent of the purchase price goes directly into your agent's pocket.

So on the sale of your \$300,000 house, her personal take of the \$18,000 commission is \$4,500. Still not bad, you say. But what if the house was worth more than \$300,000? What if, with a little more effort and patience, she could have sold it for \$310,000? After the commission, that puts an additional \$9,400 in your pocket. Yet the agent's additional share - her personal 1.5 percent - is a mere \$150. So maybe your incentives aren't aligned after all. Is the agent willing to put out all that extra time and energy for just \$150?

There's one way to find out: measure the difference between the sales data for houses that belong to real estate agents themselves and the houses they sold on behalf of clients. Using the information from those 100,000 Chicago homes, and controlling for any number of variables - location, age and quality of the house, aesthetics, and so on - it turns out an agent keeps her own home on the market an average of 10 days longer and sells it for an extra 3-plus percent, or \$10,000 on a \$300,000 house. When she sells her own house, an agent holds out for the best offer; when she sells yours, she pushes you to take the first decent offer that comes along. Like a stockbroker churning commissions, she wants to make deals and make them fast. Why not? Her share of a better offer - \$150 - is too puny an incentive to encourage her to do otherwise. So her job

is to convince you that a \$300,000 offer is in fact very good, even generous, and one that only a fool would refuse.

This can be tricky. The agent doesn't want to come right out and call you a fool. So she merely implies it - perhaps by telling you about the bigger, nicer, newer house down the block that has sat unsold for six months. This is the agent's main weapon: the conversion of information into fear. Consider this true story, related by John Donohue, a law professor who in 2001 was teaching at Stanford University: "I was just about to buy a house on the Stanford campus, and the seller's agent kept telling me what a good deal I was getting because the market was about to zoom. As soon as I signed the purchase contract, he asked me if I would need an agent to sell my previous Stanford house. I told him that I would probably try to sell without an agent, and he replied, 'John, that might work under normal conditions, but with the market tanking now, you really need the help of a broker.'"

In five minutes, a zooming market tanked. Such are the marvels that can be conjured by an agent in search of the next deal.

**So a big part** of a real estate agent's job is to persuade the homeowner to sell for less than he would like while at the same time letting potential buyers know that a house can be bought for less than its listing price. To be sure, there are subtler means of conveying this information than blatantly telling the buyer to bid low. The Chicago study also reveals how agents exert influence through the listings they write. A phrase like "well maintained," for instance, is full of meaning to an agent - the house is old but not quite falling down. A savvy buyer will know this (or find out once he sees the place), but to the retiree who is selling the house, "well maintained" might sound like a compliment, which is just what the agent intends.

An analysis of the language used in real estate ads shows that certain words are powerfully correlated with the final sale price of a house. This doesn't necessarily mean that labeling a house "well maintained" causes it to sell for less than an equivalent house. It does, however, indicate that when an agent labels a house "well maintained," she is subtly encouraging a buyer to bid low.

So consider the terms in the box on the previous page: A "fantastic" house is surely fantastic enough to warrant a high price, right? What about a "charming" and "spacious" home in a "great neighborhood!"? No, no, no, no, and no.

In fact, the terms that correlate with a higher sales price are physical descriptions of the home itself: granite, Corian, and maple. As information goes, such terms are specific and straightforward - and therefore pretty useful. If you like granite, you might like the house; but even if you don't, "granite" certainly doesn't connote a fixer-upper. Nor does "gourmet" or "state-of-the-art," both of which seem to tell a buyer that a house is, on some level, fantastic.

"Fantastic," meanwhile, is a dangerously ambiguous adjective, as is "charming." These words, it turns out, are real estate agent code for a house that doesn't have many specific attributes worth describing. "Spacious" homes, meanwhile, are often decrepit or impractical. "Great neighborhood" signals to a buyer that, well, *this* house isn't very nice but others nearby may be. And an exclamation point in a real estate ad is bad news for sure, a bid to paper over real shortcomings with false enthusiasm.

If you study an ad for a real estate agent's *own* home, meanwhile, you see that she emphasizes descriptive terms (especially "new," "granite," "maple," and "move-in condition") and avoids empty adjectives (including "wonderful," "immaculate," and the telltale "!"). She patiently waits for the best buyer to come along. She might tell this buyer about a house nearby that just sold for \$25,000 *above* the asking price, or another house that is the subject of a bidding war. She is careful to exercise every advantage of the information asymmetry she enjoys.

But even the agent's advantage has been eroded by the Internet. After all, anyone can now get online and gather information about sales trends and housing inventory and mortgage-rate tremors. And recent sales data is starting to show the results. Agents still get a higher price for their own homes than for comparable homes owned by their clients - but since the proliferation of real estate Web sites, the gap between the two prices has shrunk by a third. The information has been set loose.

*Adapted from Freakonomics: A Rogue Economist Explores the Hidden Side of Everything, copyright Steven D. Levitt and Stephen J. Dubner, published by William Morrow. Levitt is an economist at the University of Chicago. Dubner is an author and journalist.*

## **Bibliography**

Dubner, S., & Levitt, S. (2005, May). *Cracking the Real Estate Code*. Retrieved May 27, 2015, from Wired Magazine:  
[http://archive.wired.com/wired/archive/13.05/realestate.html?pg=1&topic=realestate&topic\\_set=](http://archive.wired.com/wired/archive/13.05/realestate.html?pg=1&topic=realestate&topic_set=)

## **PART 4**

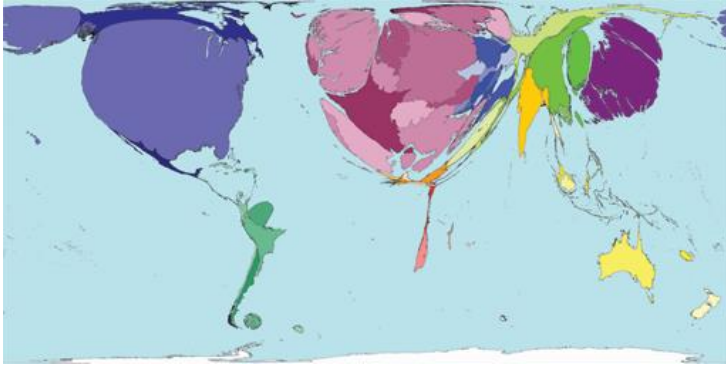
Gapminder: <http://bit.ly/2HUWDYu>

The graph I made compared Primary school completion and Babies per woman. Generally, the graphs show that the higher the percentage of people completing primary school, the lower number of births per woman. More specifically, all of the European countries have relatively low birth rates and high school completion rates. Switzerland actually surprised me as having the lowest Primary school completion rate of just over 60%, though they still average less than two births per woman. African countries show the widest variation of any other continent – ranging from Niger with only 16% Primary school completion and almost 8 births per woman to South Africa and Tunisia with almost 80% Primary school completion and around three births per woman. Both Asia and the Americas were primarily found in the high school completion – low birth rate clusters, but both groups also had outliers such as Afghanistan, Lao, Honduras, and Haiti.

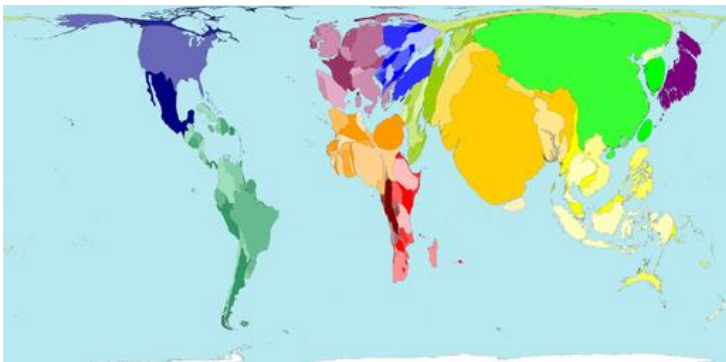
I created this graph because a prominent theory is that the more people in a community complete basic schooling, the better the economic outlook is for that nation. When women are both uneducated and spending much of their post-puberty life in child-bearing and rearing, they are unable to contribute to the national economy. Furthermore, having one-income households in areas of poor education and large families almost guarantees a poverty level existence. The data on this graph, though it is from 1993 – long before the wars in the middle east, North Africa, the Haitian earthquake and the current struggles in Central America – shows a long term trend of economic difficulties in these areas may stem from not only the troubles listed, but also traditional attitudes towards family planning and education.

[Worldmapper.org](http://Worldmapper.org)

Map 205 – Biomedical Research



Map 255 – Life Expectancy



The maps I chose compare the amount spent on Biomedical research and the life expectancy of people born in 2002. I thought that the more a country spent on research, the longer people would live in that country. However, the maps do not agree with my hypothesis. The countries with the longest life expectancy appear to be China, Indonesia and India, but they spend very little on Biomedical research comparatively. The largest spenders on Biomedical Research appear to be the United States and Western European countries. These countries do not have the longest life expectancy, though. In fact, they seem to be proportionally the same as all of South America and even some parts of Africa while those countries spend almost nothing on research. I'm sure cultural differences such as diet and other factors contribute to the long life span, but it's interesting how little research spending seems to matter.

	<b>Elements required</b>	<b>Comments</b>	<b>Points Earned</b>
<b>Part 1 (20 points possible)</b>	Submitted on or before the due date (10 points)		
	Uses evidence from Dr. Benjamin (3 point)		
	Uses evidence from Mr. Thompson (4 points)		
	Expresses a personal goal for the class beyond "I need math and don't want to take ____." (3 points)		
<b>Part 2 (20 points possible)</b>			
	Appropriate podcast episode found and cited. (5 points)		
	Summary includes all major points (5 points)		
	<b>Thoughtful reasoning</b> for your opinion on their conclusion included (10 points)		
<b>Part 3 (20 points possible)</b>			
	Article summary includes all major points (5 points)		
	Summary includes additional example from your own experience (2 points)		
	Podcast episode found and cited. (3 points)		
	Summary includes all major points (5 points)		
	<b>Thoughtful reaction</b> to findings included (5 points)		
<b>Part 4 (20 points possible)</b>	<b>See Details Below</b>		
<b>Gapminder</b>	A description of what is on each axis, what the circle size represents, which countries are shown, and for which years the graphs display meaningful data (5 points)		
	A question is stated that the graph addresses (2 point)		
	Trends or patterns are described (3 points)		
<b>Worldmapper</b>	Two different maps are printed and identified by map number (2 points)		
	Similarities between the maps are identified (or lack of similarities is explained to be key feature of the maps) (4 points)		
	Differences between the maps are identified (or a lack of differences is explained to be a key feature of the maps) (4 points)		