

1. In football, coaches often employ a strategy called “icing the kicker.” To ice the kicker, the opposing coach calls for a timeout just before the kicker is about to attempt a field goal, hoping that the delay interrupts the kicker’s concentration and will cause him to miss the kick. Does this strategy work? From 2000-2009, kickers in the NFL made 377 of 488 field goal attempts without a timeout being called before the attempt and made 157 of 197 field goal attempts after being “iced.” Is there strong evidence that “icing” a kicker causes him to miss more proportion of his kicks?

2. During the 2009 regular season, Derek Jeter had 634 at bats and 212 hits for a batting average of 0.334. In baseball, if a player hits at least 0.300, he is considered a great hitter. Is there convincing evidence that Derek Jeter is considered a great hitter in that 2009 season?

3. Many people believe that the NBA was more focused on offense in the 1980’s and more focused on defense in the 1990’s. How much greater was the scoring in the 1980’s compared to the 1990’s for NBA teams? Here are some summary statistics to compare these distributions:

Points per Game	1985	1995
Mean	110.8	101.4
Standard Deviation	4.45	5.03
Number of Teams	23	27

Does there seem to be convincing evidence that NBA teams had, on average, scored more points in 1985 than in 1995?

4. Do name-brand trash bags hold more weight than store-brand trash bags? A statistic student randomly selected 15 Glad trash bags and 15 Walmart trash bags and loaded them with oranges until they broke. Here are the results:

Glad	147	145	143	148	147	156	147	150	139	148	146	149	151	150	145
Walmart	132	138	140	139	133	133	141	131	135	139	145	132	150	139	135

Is there significant evidence that there is a difference in the mean of the two types of bags?

5. Is the express lane faster? Two of my old statistics students decided to investigate which lane was faster in a supermarket: the express lane or the regular lane. To collect their data, they randomly selected 15 times during a week, went to the same store, bought the same item. However, one of them used the express lane and the other used a regular lane. They entered their lanes at the same time, and each recorded the time in seconds it took them to complete this transaction.

Is there evidence that there is a difference in times between the express lanes and regular lanes in a supermarket?

Time in Express Lane (seconds)	Time in Regular Lane (seconds)
337	342
226	472
502	456
408	529
151	181
284	339
150	229
357	263
349	332
257	352
321	341
383	397
565	694
363	324
85	127

6. In an election between two men, does the taller candidate tend to win more often? In other words, is the height of the winner attributed to chance alone? Is there evidence that the taller candidate would win the election, especially for president?

Below is a table that gives the results of the U.S. presidential elections from 1900 to 2016. Bold names were the candidate that was elected president. (Hint, convert height into inches)

Year	Candidate	Height	Candidate	Height	Year	Candidate	Height	Candidate	Height
1900	McKinley	5'7"	Bryan	6'	1960	Kennedy	6'	Nixon	5'11.5"
1904	T. Roosevelt	5'10"	Parker	6'	1964	Johnson	6'3"	Goldwater	6'
1908	Taft	6'	Bryan	6'	1968	Nixon	5'11.5"	Humphrey	5'11"
1912	Wilson	5'11"	T. Roosevelt	5'10"	1972	Nixon	5'11.5"	McGovern	6'1"
1916	Wilson	5'11"	Hughes	5'11"	1976	Carter	5'9.5"	Ford	6'
1920	Harding	6'	Cox	5'10"	1980	Reagan	6'1"	Carter	5'9.5"
1924	Coolidge	5'10"	Davis	6'	1984	Reagan	6'1"	Mondale	5'10"
1928	Hoover	5'11"	Smith	5'9"	1988	G. Bush	6'2"	Dukakis	5'8"
1932	F. Roosevelt	6'2"	Hoover	5'11"	1992	Clinton	6'2"	G. Bush	6'2"
1936	F. Roosevelt	6'2"	Landon	5'8"	1996	Clinton	6'2"	Dole	6'2"
1940	F. Roosevelt	6'2"	Wilkie	6'1"	2000	G.W. Bush	5'11"	Gore	6'1"
1944	F. Roosevelt	6'2"	Dewey	5'8"	2004	G.W. Bush	5'11"	Kerry	6'4"
1948	Truman	5'9"	Dewey	5'8"	2008	Obama	6'	McCain	5'7"
1952	Eisenhower	5'10.5"	Stevenson	5'10"	2012	Obama	6'	Romney	6'1"
1956	Eisenhower	5'10.5"	Stevenson	5'10"	2016	Trump	6'3"	Clinton	5'7"

1) Is there significant evidence that in the election of presidents, that the average height of the president-elect was more than the average height of the loser? Carry out a 1% significance test.

2) Construct and interpret a 99% confidence interval for the difference in mean height between the president-elect and the candidate that lost.

3) Is there evidence that the proportion of the heights of those elected president was greater than the proportion of those not elected?