A) Two students in my past AP class wanted to know if generic chocolate chip cookies have as many chocolate chips as name-brand chocolate chip cookies. To investigate, they randomly selected 10 bags of Chips Ahoy cookies and 10 bags of Great Value cookies and randomly selected 1 cookie from each bag. Then they carefully broke apart each cookie and counted the number of chocolate chips in each. Here are their results:

Chips Ahoy	17	19	21	16	17	18	20	21	17	18
Great Value	22	20	14	17	21	22	15	19	26	16

1) Construct and interpret a 99% confidence interval for the difference in the mean number of chocolate chips in Chips Ahoy and Great Value cookies.
2) Does your interval provide convincing evidence that there is a difference in the mean number of chocolate chips?

B) After buying many helium balloons only to see them deflate within a couple of days, an investigation was started to test whether helium-filled balloons deflate more quickly than air-filled balloons. 60 balloons were bought and randomly divided them into 2 piles of 30, filling the balloons in the first pile with helium and the balloons in the second pile with air. Then they measured the circumference of each balloon immediately after it was filled and again 3 days later. The average decrease in circumference of the helium-filled balloons was 26.5 cm with a standard deviation of 1.92 cm. The average decrease in circumference in the air-filled balloons was 2.1 cm with a standard deviation of 2.79 cm.

1) Do these data provide convincing evidence that helium-filled balloons deflate more quickly than air-filled balloons?
2) Interpret the p-value you got in part (a) in the context of the study.

C) Coaching companies claim that their courses can raise the SAT scores of high school students. Of course, students who retake the SAT without paying for coaching generally raise their scores. A random sample of students who took the SAT twice found 427 who were coached and 2733 who were uncoached. Starting with their Verbal scores on the first and second tries, we have their summary statistics:

1) Let's first ask if students who are coached increased their scores significantly. You can use information on the Coached line to carry out either a two-sample t-test comparing Try 1 with Try 2 for coached students or a paired t-test using Gain. Which is the correct test? Why?
2) Carry out the proper test. What do you conclude?
3) What we really want to know is whether coached students improve more than uncoached students and whether any advantage is large enough to be worth paying for. How much more do coached students gain on the average? Construct and interpret a 99% confidence interval.
4) Does the interval in question #3 give convincing evidence that coached students gain more, on average, than uncoached students? Explain.
5) Describe a Type I and Type II error. What are the consequences of each?