Information

The following applies to Questions **1** and **2**.

Reading comprehension test scores of elementary school children randomly assigned to one of two teaching methods have the following summary statistics:

	# of Children	Mean	Standard Deviation
Method 1	13	64	5
Method 2	13	69	8

We would like to conduct a hypothesis test to determine whether the true mean test score differs for the two teaching methods. Suppose that all necessary assumptions have been satisfied.

Question 1 (1 point)

What type of test should be used?

Question 1 options:

- A) unpooled (conservative) independent two-sample *t* test
- B) pooled independent two-sample *t* test
- C) matched pairs *t* test

Question 2 (1 point)

What are the degrees of freedom for the appropriate test of significance?

Information

The following applies to Questions **3 - 6.**

Twenty volunteers agree to participate in a study on the effectiveness of a new diet on weight loss. The volunteers are weighed prior to beginning the diet and after six weeks on the diet. The sample mean weight loss (weight before the diet minus weight after six weeks on the diet) is 7 pounds and the sample standard deviation of the weight losses is 13 pounds.

Question 3 (1 point)

Which of the following statements is/are **true**?

- ☐ A) For each person, before-diet weight and after-diet weight are independent.
- ☐ B) For each person, before-diet weight and after-diet weight are dependent.
- ☐ C) In order to conduct a matched pairs *t* test, we must assume that differences in before-diet weight and after-diet weight are normally distributed.
- ☐ D) In order to conduct a matched pairs *t* test, we must assume that before-diet weight and after-diet weight are both normally distributed.

Question 4 (1 point)

We would like to construct a 95% confidence interval for the true mean difference in weight before and after undertaking the diet. What is the margin of error for the confidence interval?

Keep 4 decimal places in intermediate calculations and report your final answer to 2 decimal places.

Question 5 (1 point)

We would like to conduct a hypothesis test to determine if the diet is successful in reducing weight. What is the P-value for the appropriate test of significance?

Between

[ ] and [ ]

Input the smaller probability in the first blank and the larger probability in the second blank.

Question 6 (1 point)

What is the interpretation of the P-value obtained in the previous question?

Information

The following applies to Questions **7 - 11**.

We would like to estimate the difference in the mean age of registered Liberals and registered Conservative. The mean age of a random sample of 14 registered Liberals is 43 years with a standard deviation of 7 years. The mean age of a random sample of 18 registered Conservatives is 38 years with a standard deviation of 4 years.

Question 7 (1 point)

Construct a 99% confidence interval for the difference in the true mean ages of Liberals and Conservatives.

Lower limit:

Upper limit:

Question 8 (1 point)

What is the proper interpretation of the confidence interval obtained in the previous question?

Question 9 (1 point)

We would like to conduct a hypothesis test at the 1% level of significance to determine whether there is a difference in the true mean age of Liberals and Conservatives. What is the rejection rule using the critical value method?

Question 10 (1 point)

Calculate the test statistic and use your answer to Question 9 to decide to reject H_0 or fail to reject H_0.

Question 11 (1 point)

Could you have used the confidence interval in Question 7 to conduct the hypothesis test in Question 9? Why or why not? If you could use the interval to conduct the test, explain what your conclusion would be and why.

Information

The following applies to Questions **12 - 15**.

The midterm scores for samples of students from two sections of a large course have the following summary statistics:

	# of Students	Mean	Standard Deviation
Section A01	10	64.6	20.20
Section A02	8	71.0	9.27

We would like to conduct a hypothesis test to determine whether the true mean midterm score for Section A02 students is higher than the true mean midterm score for Section A01 students.

Question 12 (1 point)

What are the hypotheses for the appropriate test of significance?

A) $H_0 : \mu_{A02} = \mu_{A01}$ vs. $H_a : \mu_{A02} \neq \mu_{A01}$

B) $H_0 : \overline{X}_{A02} = \overline{X}_{A01}$ vs. $H_a : \overline{X}_{A02} \neq \overline{X}_{A01}$

C) $H_0 : \mu_{A02} = \mu_{A01}$ vs. $H_a : \mu_{A02} > \mu_{A01}$

D) $H_0 : \overline{X}_{A02} = \overline{X}_{A01}$ vs. $H_a : \overline{X}_{A02} > \overline{X}_{A01}$

Question 13 (1 point)

Explain what it would mean to make a Type I error in the context of this example.

Question 14 (1 point)

What is the P-value for the appropriate test of significance?

Between

_____ and _____

Input the smaller probability in the first blank and the larger probability in the second blank.

Question 15 (1 point)

What is the conclusion of the hypothesis test at the 5% level of significance?

(The answer is partially pre-filled. Edit/add to the answer.)

We have sufficient/insufficient evidence to conclude that ...