Classwork on Chapter 8

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Provide an appropriate response.

1) Suppose you want to test the claim that $\mu_1 = \mu_2$. Two samples are random, independent, and come from populations that are normally distributed. The sample statistics are given below. Assume that $\sigma_1^2 \neq \sigma_2^2$. At a level of significance of $\alpha = 0.01$, when should you reject H_0? 1) _____

$n_1 = 25$ $n_2 = 30$
$\bar{x}_1 = 27$ $\bar{x}_2 = 25$
$s_1 = 1.5$ $s_2 = 1.9$

A) Reject H_0 if the standardized test statistic is less than –2.492 or greater than 2.492.
B) Reject H_0 if the standardized test statistic is less than –2.789 or greater than 2.797.
C) Reject H_0 if the standardized test statistic is less than –2.797 or greater than 2.797.
D) Reject H_0 if the standardized test statistic is less than –1.711 or greater than 1.711.

2) Suppose you want to test the claim that $\mu_1 = \mu_2$. Two samples are random, independent, and come from populations that are normally distributed. The sample statistics are given below. Assume that $\sigma_1^2 = \sigma_2^2$. At a level of significance of $\alpha = 0.05$, when should you reject H_0? 2) _____

$n_1 = 14$ $n_2 = 12$
$\bar{x}_1 = 7$ $\bar{x}_2 = 8$
$s_1 = 2.5$ $s_2 = 2.8$

A) Reject H_0 if the standardized test statistic is less than –2.064 or greater than 2.064.
B) Reject H_0 if the standardized test statistic is less than –2.492 or greater than 2.492
C) Reject H_0 if the standardized test statistic is less than –1.318 or greater than 1.318.
D) Reject H_0 if the standardized test statistic is less than –1.711 or greater than 1.711.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

3) A sports analyst claims that the mean batting average for teams in the American League is not equal to the mean batting average for teams in the National League because a pitcher does not bat in the American League. The data listed below are random, independent, and come from populations that are normally distributed. At $\alpha = 0.05$, test the sports analyst's claim. Assume the population variances are equal. 3) _____

American League				National League			
0.279	0.274	0.271	0.268	0.284	0.267	0.266	0.263
0.265	0.254	0.240		0.261	0.259	0.256	

4) A study was conducted to determine if the salaries of elementary school teachers from two neighboring districts were equal. A sample of 15 teachers from each district was randomly selected. The mean from the first district was $28,900 with a standard deviation of $2300. The mean from the second district was $30,300 with a standard deviation of $2100. Test the claim that the salaries from both districts are equal. Assume the samples are random and independent, and the populations are normally distributed. Also, assume that $\sigma_1^2 = \sigma_2^2$. Use $\alpha = 0.05$. 4) _____

5) Nine students took the SAT. Their scores are listed below. Later on, they took a test preparation course and retook the SAT. Their new scores are listed below. Test the claim that the test preparation had no effect on their scores. Assume the samples are random and dependent, and the populations are normally distributed. Use $\alpha = 0.05$. 5) _____

Student	1	2	3	4	5	6	7	8	9
Scores before course	720	860	850	880	860	710	850	1200	950
Scores after course	740	860	840	920	890	720	840	1240	970

6) A weight–lifting coach claims that weight–lifters can increase their strength by taking a certain supplement. To test the theory, the coach randomly selects 9 athletes and gives them a strength test using a bench press. The results are listed below. Thirty days later, after regular training using the supplement, they are tested again. The new results are listed below. Test the claim that the supplement is effective in increasing the athletes' strength. Assume the samples are random and dependent, and the populations are normally distributed. Use $\alpha = 0.05$. 6) _____

Athlete	1	2	3	4	5	6	7	8	9
Before	215	240	188	212	275	260	225	200	185
After	225	245	188	210	282	275	230	195	190

7) A physician claims that a person's diastolic blood pressure can be lowered if, instead of taking a drug, the person listens to a relaxation tape each evening. Ten subjects are randomly selected and pretested. Their blood pressures, measured in millimeters of mercury, are listed below. The 10 patients are given the tapes and told to listen to them each evening for one month. At the end of the month, their blood pressures are taken again. The data are listed below. Test the physician's claim. Assume the samples are random and dependent, and the populations are normally distributed. Use $\alpha = 0.01$. 7) _____

Patient	1	2	3	4	5	6	7	8	9	10
Before	85	96	92	83	80	91	79	98	93	96
After	82	90	92	75	74	80	82	88	89	80

8) A recent survey showed that in a random sample of 100 elementary school teachers, 15 smoked. In a random sample of 180 high school teachers, 36 smoked. Is the proportion of high school teachers who smoke greater than the proportion of elementary teachers who smoke? Use $\alpha = 0.01$. 8) _____

9) To test the effectiveness of a new drug designed to relieve pain, 200 patients were randomly selected and divided into two equal groups. One group of 100 patients was given a pill containing the drug while the other group of 100 was given a placebo. What can we conclude about the effectiveness of the drug if 62 of those actually taking the drug felt a beneficial effect while 41 of the patients taking the placebo felt a beneficial effect? Use $\alpha = 0.05$. 9) _____

10) In a random survey of 500 doctors that practice specialized medicine, 20% felt that the government should control health care. In a random sample of 800 doctors that were general practitioners, 30% felt that the government should control health care. Test the claim that there is a difference in the proportions. Use $\alpha = 0.10$. 10) _____

1) C
2) A
3) Standardized test statistic ≈ –0.167; critical value $t_0 = \pm 2.179$; fail to reject H_0; There is not sufficient evidence to support the claim.
4) critical value $t_0 = \pm 2.048$; standardized test statistic $t \approx -1.741$; fail to reject H_0; There is not sufficient evidence to reject the claim.
5) claim: $\mu_d = 0$; critical values $t_0 = \pm 2.306$; standardized test statistic $t \approx -2.401$; reject H_0; There is sufficient evidence to reject the claim.
6) claim: $\mu_d < 0$; critical value $t_0 = -1.860$; standardized test statistic $t \approx -2.177$; reject H_0; There is sufficient evidence to support the claim.
7) claim: $\mu_d > 0$; critical value $t_0 = 2.821$; standardized test statistic $t \approx 3.490$; reject H_0; There is sufficient evidence to support the claim.
8) claim: $p_1 < p_2$; critical value $z_0 = -2.33$; standardized test statistic $t \approx -1.039$; fail to reject H_0; There is not sufficient evidence to support the claim.
9) claim: $p_1 = p_2$; critical values $z_0 = \pm 1.96$; standardized test statistic $t \approx 2.971$; reject H_0; The new drug is effective.
10) claim: $p_1 \neq p_2$; critical values $z_0 = \pm 1.645$; standardized test statistic ≈ –3.991; reject H_0; There is sufficient evidence to support the claim.