

Name: _____

Date: _____

AP Statistics Chapter 12 and 13 Review on TWO Sample Hypothesis Test

For each of the following questions below, make sure to state your hypothesis, show all your work and steps for the P-value and test statistics, and also interpret your results

1. In a test of the reliability of products produced by two machines, machine A produced 15 defective parts in a run of 280, while machine B produced 10 defective parts in a run of 200. Do these results imply a difference in the reliability of these two machines? (Use $\alpha = 0.01$.)
2. Two sections of a class in statistics were taught by two different methods. Students' scores on a standardized test are shown below. Do the results present evidence of a difference in the effectiveness of the two methods? (Use $\alpha = 0.01$.)

Class A		Class B	
74	76	78	79
97	75	92	76
79	82	94	93
88	86	78	82
78	100	71	69
93	94	85	84
		70	

3. The table below shows the observed pollution indexes of air samples in two areas of a city. Test the hypothesis that the mean pollution indexes are the same for the two areas. (Use $\alpha = 0.05$.)

Area A		Area B	
2.92	4.69	1.84	3.44
1.88	4.86	0.95	3.69
5.35	5.81	4.26	4.95
3.81	5.55	3.18	4.47

4. A closer examination of the records of the air samples in Example 3 reveals that each line of the data actually represents readings on the same day: 2.92 and 1.84 are from day 1, and so forth. Since this affects the validity of the results obtained in Example 10, reanalyze. (Use $\alpha = 0.05$.)

Area A	Area B	$y_d = A - B$
2.92	1.84	1.08
1.88	0.95	0.93
5.35	4.26	1.09
3.81	3.18	0.63
4.69	3.44	1.25
4.86	3.69	1.17
5.81	4.95	0.86
5.55	4.47	1.08

5. Eight quantities of effluent from a pulp mill were each divided into ten batches. From each quantity, five randomly selected batches were subjected to a treatment process intended to remove toxic substances. Five fish of the same species were placed in each batch, and the mean number surviving in the five treated and untreated portions of each effluent quantity after five days were recorded and are given below. Test to see if the treatment increased the mean number of surviving fish. (Use $\alpha = 0.01$.)

Quantity No.	1	2	3	4	5	6	7	8
Mean Number Surviving								
Untreated	5	1	1.8	1	3.6	5	2.6	1
Treated	5	5	1.2	4.8	5	5	4.4	2
$y_d = U - T$	0	-4	0.6	-3.8	-1.4	0	-1.8	-1

6. In a test of the effectiveness of a device that is supposed to increase gasoline mileage in automobiles, 12 cars were run, in random order, over a prescribed course both with and without the device in random order. The mileages (mpg) are given below. Is there evidence that the device is effective? (Use $\alpha = 0.01$.)

Car	Without Device	With Device	$y_d = \text{With} - \text{Without}$
1	21.0	20.6	-0.4
2	30.0	29.9	-0.1
3	29.8	30.7	0.9
4	27.3	26.5	-0.8
5	27.7	26.7	-1.0
6	33.1	32.8	-0.3
7	18.8	21.7	2.9
8	26.2	28.2	2.0
9	28.0	28.9	0.9
10	18.9	19.9	1.0
11	29.3	32.4	3.1
12	21.0	22.0	1.0