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8.3 The dynamic modulus of concrete is obtained for two different concrete mixes. For the first mix, $n_1 = 33$, $\bar{x} = 115.1$, and $s_1 = 0.47$ psi. For the second mix, $n_2 = 31$, $\bar{y} = 114.6$, and $s_2 = 0.38$. Test, with $\alpha = 0.05$, the null hypothesis of equality of mean dynamic modulus versus the two-sided alternative.

8.4 Refer to Exercise 8.3 and obtain a 95% confidence interval for the difference in mean dynamic modulus.

8.5 An investigation of two kinds of photocopying equipment showed that 75 failures of the first kind of equipment took on the average 83.2 minutes to repair with a standard deviation of 19.3 minutes, while 75 failures of the second kind of equipment took on the average 90.8 minutes to repair with a standard deviation of 21.4 minutes.

(a) Test the null hypothesis $\mu_1 - \mu_2 = 0$ (namely, the hypothesis that on the average it takes an equal amount of time to repair either kind of equipment) against the alternative hypothesis $\mu_1 - \mu_2 \neq 0$ at the level of significance $\alpha = 0.05$.

please ignore this part

(b) ~~Using 19.3 and 21.4 as estimates of σ_1 and σ_2, find the probability of failing to reject the null hypothesis $\mu_1 - \mu_2 = 0$ with the criterion of part (a) when actually $\mu_1 - \mu_2 = -12$.~~

8.6 Studying the flow of traffic at two busy intersections between 4 P.M. and 6 P.M. (to determine the possible need for turn signals), it was found that on 40 weekdays there were on the average 247.3 cars approaching the first intersection from the south that made left turns while on 30 weekdays there were on the average 254.1 cars approaching the second intersection from the south that made left turns. The corresponding sample standard deviations are $s_1 = 15.2$ and $s_2 = 18.7$.

(a) Test the null hypothesis $\mu_1 - \mu_2 = 0$ against the alternative hypothesis $\mu_1 - \mu_2 \neq 0$ at the level of significance $\alpha = 0.01$.

~~(b) Using 15.2 and 18.7 as estimates of σ_1 and σ_2, find the probability of failing to reject (accepting) the null hypothesis $\mu_1 - \mu_2 = 0$ when actually $|\mu_1 - \mu_2| = 15.6$.~~

ignore part (b)

8.10 As part of an industrial training program, some trainees are instructed by Method *A*, which is straight computer-based instruction, and some are instructed by Method *B*, which also involves the personal attention of an instructor. If random samples of size 10 are taken from large groups of trainees instructed by each of these two methods, and the scores which they obtained in an appropriate achievements test are

Method A:	71	75	65	69	73	66	68	71	74	68
Method B:	72	77	84	78	69	70	77	73	65	75

use the 0.05 level of significance to test the claim that Method *B* is more effective. Assume that the populations sampled can be approximated closely with normal distributions having the same variance.

8.14 A civil engineer wants to compare two instruments for measuring the amount of polychlorinated biphenyls (PCBs) in corn stalks. A sample of stalks is cut and crushed and two scoops of the material taken. One is measured with the first instrument and the other with the second instrument. This whole process is repeated five times. The results, in parts per billion, are as follows:

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Sample No.	Instrument 1	Instrument 2
1	3	4
2	8	7
3	9	6
4	4	3
5	6	5

Find a 95% confidence interval for the mean difference in instrument readings assuming the differences have a normal distribution.

8.15 Refer to Exercise 8.14. Test, with $\alpha = 0.05$, that the mean difference is 0 versus a two-sided alternative.

10.23 An airline claims that only 6% of all lost luggage is never found. If, in a random sample, 17 of 200 pieces of lost luggage are not found, test the null hypothesis $p = 0.06$ against the alternative hypothesis $p > 0.06$ at the 0.05 level of significance.

10.32 Photolithography plays a central role in manufacturing integrated circuits made on thin disks of silicon. Prior to a quality-improvement program, too many rework operations were required. In a sample of 200 units, 26 required reworking of the photolithographic step. Following training in the use of Pareto charts and other approaches to identify significant problems, improvements were made. A new sample of size 200 had only 12 that needed rework.

Is this sufficient evidence to conclude at the 0.01 level of significance that the improvements have been effective in reducing the rework?

10.33 With reference to Exercise 10.32, find a large sample 99% confidence interval for the true difference of the proportions.