**Due Wednesday, August 3, 2022 (11:59 pm)**

***Problem 1*:** In a comparison of the effectiveness of distance learning with traditional classroom instruction, 12 students took a business administration course online, while 14 students took it in a classroom. The final scores were as follows.

|  |  |
| --- | --- |
| Online | 64 66 74 69 75 72 77 83 77 91 85 88 |
| Classroom | 80 77 74 64 71 80 68 85 83 59 55 75 81 81 |

Can you conclude that the mean score differs between the two types of course?

(Wilcoxon)

H0: online = classroom

H1: online ≠ classroom (i.e means are differ)

Graphical user interface, application, table, Excel

Description automatically generated

Z = W – m(m+n+1)/2 / sq(mn(m+n+1)/12) = 173.5-162/3sq(42) = 0.591 ->0.7224

Would be 1 – z value but since we’re doing ±z value we can just multiply by 2 the negative z score value

Both sides = 0.555 (p-value)

P-value is the probability the null hyp is true, lower it is the more different.

**P value > 0.05. This means we cannot conclude that the mean scores differ. (i.e H0 plausible)**

***Problem 2*:** Scores on the math SAT are normally distributed. A sample of 20 SAT scores had standard deviation of 87. Someone says that the scoring system for the SAT is designed so that the population standard deviation will be σ = 100. Do these data provide sufficient evidence to contradict this claim?

(6.11 chi-square)

H0: population deviation = 100

H1: population deviation ≠ 100

Sample: 20

Deviation: 87

(n-1)s^2/sigma^2 = (20-1)(87^2)/100^2 = 14.3811

Df = 19 at 0.05 significance = 30.144

**30.144 > 14.3811 the critical value is greater than our test statistic so the null hypothesis is plausible at significance level of 0.05. Therefore, there is not enough evidence to suggest that the population deviation won’t be equal to 100.**

***Problem 3*:** A vendor claims that no more than 10% of the parts she supplies are defective. Let p denote the actual proportion of parts that are defective. A test is made of the hypotheses

*H0*: versus *H1*: . For each of the following situations, determine whether the decision was correct, a type I error occurred, or a type II error occurred.

1. The claim is true, and *H0* is rejected. **Type I**
   1. If the claim is true then we shouldn’t reject H0 bc we test against H1 for the plausibility of null
2. The claim is false, and *H0* is rejected. **Correct**
   1. False claim means we do reject
3. The claim is true, and *H0* is not rejected. **Correct**
   1. True claim means its plausible
4. The claim is false, and *H0* is not rejected. **Type II**
   1. False claim means we reject null

Type I: reject H0 when its actually true

Type II: Plausible H0 when you should reject