Test 5 Review 3

1) In many colleges and universities around the country, educators are changing their approach to instruction from a "teacher/lecture-centered model" to a "student-centered model" where students learn in a laboratory environment in which students can proceed at a pace suitable to their learning needs and lecture is de-emphasized. In one school where this model was being introduced,
- Of the 743 students who enrolled in the traditional lecture model, 364 passed.
- Of the 567 in the student-centered model, 335 passed.

Test the claim that the student-centered model results in a higher pass rate than the traditional model at the 0.05 level of significance.

① #1 : Student Centered

H_0 : $P_1 = P_2$

H_1 : $P_1 > P_2$

② $\alpha = .05$

③ 2 Proportion

④ $z = 3.63$ P-value $= 0.0001$

⑤ __Reject__ H_0.

There __IS__ suff. evid. to conclude that the pass rate is higher for the student centered model.

2) In a Gallup poll 513 national adults aged 18 years of age or older who consider themselves to be Republican were asked, "Of every tax dollar that goes to the federal government in Washington, D.C., how many cents of each dollar would you say are wasted?" The mean wasted was found to be 54 cents with a standard deviation of 2.9 cents. The same question was asked of 513 national adults aged 18 years of age or older who consider themselves to be Democrat. The mean wasted was found to be 41 cents with a standard deviation of 2.6 cents.

At the 0.05 level of significance, test the claim that the mean amount that Republicans feel is wasted is higher than the mean amount that Democrats feel are wasted.

① #1 : Republican

$H_0 : \mu_1 = \mu_2$

$H_1 : \mu_1 > \mu_2$

② $\alpha = .05$

③ 2 Mean

④ $t = 75.60$ P-value < .0001

⑤ <u>Reject</u> H_0

There __IS__ suff. evid. to conclude that the mean amount that Republicans feel is wasted is higher than the mean amount Democrats feel is wasted.

3) A random sample of Americans was asked if they believed that everyone has an equal opportunity to obtain a quality education in the United States. Here are the results, broken down by level of education.

	Yes	No
Less than High School	302	83
High School	551	200
Associate Degree	29	24
Bachelor Degree	100	71
Graduate Degree	46	31

At the 0.05 level of significance, test the claim that the response is independent of a person's level of education.

① H_0: The response is independent of a person's gender.

H_1: The response is dependent on a person's gender.

② $\alpha = .05$

③ Independence

④ $\chi^2 = 37.20$ P-value $< .0001$

⑤ __Reject__ H_0.

There __IS__ suff. evid. to conclude that the response is dependent on gender.

4) To illustrate the effects of driving under the influence (DUI) of alcohol, a police officer brought a DUI simulator to a local high school. Student reaction time in an emergency was measured with unimpaired vision and also while wearing a pair of special goggles to simulate the effects of alcohol on vision. For a random sample of nine teenagers, the time (in seconds) required to bring the vehicle to a stop from a speed of 60 miles per hour was recorded.

Subject	1	2	3	4	5	6	7	8	9
Normal	4.47	4.24	4.58	4.65	4.31	4.80	4.55	5.00	4.79
Impaired	5.77	5.67	5.51	5.32	5.83	5.49	5.23	5.61	5.63

Test the claim that there is no difference in braking time with impaired vision and normal vision at the 0.05 level of significance.

① $d =$ Normal − Impaired

$H_0 : \mu_d = 0$

$H_1 : \mu_d \neq 0$

② $\alpha = .05$

③ Paired Difference

④ $t = -8.08$ P-value $< .0001$

⑤ __Reject__ H_0.

There __IS__ suff. evid to conclude that there is a difference in braking time with impaired vision & normal vision.

5) A stock analyst wondered whether the mean rate of return of financial, energy, and utility stocks differed over the past 5 years. He obtained a simple random sample of eight companies from each of the three sectors and obtained the 5-year rates of return shown in the following table (in percent):

Financial	Energy	Utilities
10.76	12.72	11.88
15.05	13.91	5.86
17.01	6.43	13.46
5.07	11.19	9.90
19.50	18.79	3.95
8.16	20.73	3.44
10.38	9.60	7.11
6.75	17.40	15.70

At the 0.05 level of significance, test the claim that the mean rate of return is the same for all 3 sectors.

① $H_0: \mu_1 = \mu_2 = \mu_3$

$H_1:$ At least 1 mean is different than the others.

② $\alpha = .05$

③ ANOVA

④ $F = 2.08$ P value = .1502

⑤ <u>Fail to Reject</u> H_0.

There is <u>Not</u> suff. evid. to conclude that at least 1 mean is different than the others.

6) An FBI agent claims that 42% of the weapons used in robberies are guns, 9% are knives, and 49% are something else. The data represent the weapon of choice in 795 randomly selected robberies.

Weapon	Gun	Knife	Other
Proportion	329	122	344

Test the FBI agent's claim at the 0.05 level of significance.

① H_0 : $P_1 = .42$, $P_2 = .09$, $P_3 = .49$

H_1 : At least 1 proportion is different than claimed.

② $\alpha = .05$

③ Goodness of Fit

④

O	E
329	795(.42) = 333.9
122	795(.09) = 71.55
344	795(.49) = 389.55

$\chi^2 = 40.97$

P-value < .0001

⑤ __Reject__ H_0.

There __IS__ suff. evid. to conclude that at least 1 proportion is different than claimed.