TWO POPULATION TESTING HOMEWORK.

A recent year was randomly picked from 1985 to the present. In that year, there were 2,051 Hispanic students at Cabrillo College out of a total of 12,328 students. At Lake Tahoe College, there were 321 Hispanic students out of a total of 2,441 students. We are interested to know whether the percent of Hispanic students at the two colleges is basically the same or different.

1. State the null and the alternative hypotheses for your test.

2. Find a point estimate for the difference between population proportions.

3. Find the p-value for this test.

4. What can you conclude about the population proportions with 95% confidence?

After hurricanes Katrina and Rita caused massive flooding in New Orleans, it was thought that cleaning flood-damaged homes might present a health hazard due to the large amounts of mold present in many of the homes. In a random sample of 365 residents of Orleans Parish who had participated in the cleaning, 77 had experienced symptoms of wheezing, and in a sample of 179 residents who had not participated in cleaning, 23 reported wheezing symptoms. Can we conclude that the proportion of residents with symptoms is greater among those who participated in the cleaning of flood-damaged homes? Use $\alpha = 0.05$ significance level.

5. State the null and the alternative hypotheses for your test.

6. Find point estimates for the population proportions.

7. Find a 95% confidence interval for the difference between population proportions.

8. Find the p-value for this test.

9. State the conclusion.

The following problem is adapted from "To Breakfast or Not to Breakfast?" by Richard Ayore.

Shamba (garden) workers in Kenya argued about whether they are more productive working in the garden before or after breakfast. One day they went to work as usual without breakfast, and recorded the time they could work before getting tired and stopping. On the next day, they all ate breakfast before going to work. They recorded how long they worked again before getting tired and stopping. Of interest was their mean change in work time. Though not sure, Richard's brother insisted that it was more than two hours.

The number of work hours for each worker is given as a matched data sample:

Work hours with breakfast	8	7	9	5	9	8	10	7	6	9
Work hours without breakfast	6	5	5	4	7	7	7	5	6	5

10. State the null and the alternative hypotheses for your test.

11. Find a point estimate for the mean difference.

12. Find the p-value for this test.

13. Do you think there is enough evidence for the claim that their mean change in work time was greater than 2 hours?

---

14. A new postsurgical treatment was compared with a standard treatment. Seven subjects received the new treatment, while seven others (the control group) received the standard treatment. The recovery times, in days, are given below.

New Treatment: 24, 21, 20, 19, 15, 13, 12

Control: 39, 32, 35, 30, 24, 23, 18

Can we conclude that the mean recovery time for those receiving the new treatment is less than the mean for those receiving the standard treatment? Use $\alpha = 0.1$ significance level.

The Eastern and Western Major League Soccer conferences have a new Reserve Division that allows new players to develop their skills. Data for a randomly picked date showed the following annual goals. We are interested in finding whether Western or Eastern division teams score more goals on average.

Western		Eastern	
Los Angeles	9	D.C. United	9
FC Dallas	3	Chicago	8
Chivas USA	4	Columbus	7
Real Salt Lake	3	New England	6
Colorado	4	MetroStars	5
San Jose	4	Kansas City	3

15. State the null and the alternative hypotheses for your test.

16. Find a point estimate for the difference of means.

17. Find the p-value for this test.

18. Can we say with 90% confidence that the average number of goals is different for Western teams and Eastern teams?

ANSWERS.

1. $H_0 : p_1 = p_2, \quad H_1 : p_1 \neq p_2,$ using two-tailed `prop.test`

2. 0.0348657

3. 2.079×10^{-5}

4. The data provides sufficient evidence to conclude that the proportions of Hispanic students are different in these two colleges.

10. $H_0 : \mu = 2, \quad H_1 : \mu > 2,$ μ is the mean difference, using two-tailed t-test

11. 2.1

12. 0.8114

15. $H_0 : \mu_1 = \mu_2, \quad H_1 : \mu_1 \neq \mu_2,$ using two-tailed t-test

16. -1.833333

17. 0.1813

18. No, the data does not provide enough evidence to conclude that population means are different.