Name:

MATH 321: Homework 7

Due _____: Turn in a hard copy, neat and stapled.

For all the questions below, do the following:

- Define the parameter(s) of interest AND state the null and alternative hypotheses.
- Define the test statistic and calculate it.
- Determine the rejection region and/or calculate the p-value as necessary.
- State the conclusion and any additional insights that can be drawn.

1. A survey published in the American Journal of Sports Medicine reported the number of meters (m) per week swum by two groups of swimmers – those who competed exclusively in breaststroke and those who competed in the individual medley (which includes breaststroke). The number of meters per week practicing the breaststroke was recorded for each swimmer, and the summary statistics are given below.

   Is there sufficient evidence to indicate that the average number of meters per week spent practicing breaststroke is greater for exclusive breaststrokers than it is for those swimming individual medley? Use $\alpha = 0.05$ and the "traditional method" to make your conclusion.

	Specialty	
	Exclusively Breaststroke	Individual Medley
Sample size	130	80
Sample mean (m)	9017	5853
Sample standard deviation (m)	7162	1961
Population mean	μ_1	μ_2

2. The hourly wages in a particular industry are normally distributed with mean \$13.20 and standard deviation \$2.50. A company in this industry employs 40 workers, paying them an average of \$12.20 per hour.

   Can this company be accused of paying substandard wages? Use an $\alpha = 0.01$ level test and the "p-value" method to make your conclusion.

3. The commercialism of the U.S. space program has been a topic of great interest since Dennis Tito paid \$20 million to ride along with the Russian cosmonauts on the space shuttle. In a survey of 500 men and 500 women, 20% of the men and 26% of the women responded that space should remain commercial free.

   Does statistically significant evidence exist to suggest that there is a difference in the population proportions of men and women who think that space should remain commercial free? Use $\alpha = 0.05$.

4. Operators of gasoline-fueled vehicles complain about the price of gasoline in gas stations. The total tax per gallon for gasoline at each of these 18 locations is given below (in cents). Suppose that these measurements constitute a random sample of size 18:

42.89	53.91	48.55	47.90	47.73	46.61
40.45	39.65	38.65	37.95	36.80	35.95
35.09	35.04	34.95	33.45	28.99	27.45

   Is there sufficient evidence to claim that the average per gallon gas tax is less than 41 cents? Use $\alpha = 0.05$.

Select answers

1. $TS \approx 4.756 \implies$ Reject H_0
2. p-value $\approx 0.0057 \implies$ Reject H_0
3. $TS \approx -2.254$, p-value $\approx 0.024 \implies$ Reject H_0
4. $TS \approx -0.858$, p-value $\approx 0.201 \implies$ Fail to reject H_0