Name: _____

Score: _____ / _____

HW5

Part 1: Part 1

1

A researcher is interested in knowing if patients under 30 years of age and over 30 years of age are equally satisfied with the care they receive at a clinic. To examine this issue, during a one month period, a random sample of 150 patients seen at the clinic was asked to complete a patient satisfaction scale at the end of their visit. Scores on the satisfaction scale were compared for patients under 30 years of age with those over 30 years of age.

The most appropriate significance test/test of inference is:

- A. a one group t-test on means
- B. a paired groups t-test on means
- C. an independent groups t-test on means

2

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The alternative hypothesis/directionality of the test is:

- A. directional
- B. non-directional
- C. cannot be determined

3

To determine whether a physical rehabilitation treatment reduces the amount of pain among patients who are suffering from lower back pain, 85 patients are administered a test of perceived pain both before the treatment, as well as six months after the treatment.

The most appropriate significance test/test inference is:

- A. a one group t-test on means
- B. a paired groups t-test on means
- C. an independent groups t-test on means

4

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5

The average HDL reading for American adults has been found to be 54.3 mg/dL. A group of 65 American adults in a research study were found to have an average HDL reading of 57 mg/dL with standard deviation 4 mg/dL. The researcher wants to know if the HDL levels for these 65 adults are greater than the national average.

The most appropriate significance test/test inference is:

- A. a one group t-test on means
- B. a paired groups t-test on means
- C. an independent groups t-test on means

6

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The alternative hypothesis/directionality of the test is:

- A. directional
- B. non-directional
- C. cannot be determined

Part 2: Part 2

Suppose that the weight of 10-year old girls in the U.S. population is normally distributed with a mean of 73 pounds. Data were collected for a study concerning weights of girls in Town X. A sample of 37 10-year old girls in Town X was found to have a mean weight of 75.9 pounds and a standard deviation of 7.7 pounds. Using a 5% significance level, a researcher wants to determine if 10-year old girls in Town X have weights that differ significantly from the population of 10-year old girls in the general U.S. population. The following tables are provided. Please answer questions that follow.

Critical Values for the T-Distribution

α (1 tail)	0.05	0.025	0.01	0.005	0.0025	0.001	0.0005
α (2 tail)	0.1	0.05	0.02	0.01	0.005	0.002	0.001
df							
1	6.3138	12.7065	31.8193	63.6551	127.3447	318.4930	636.0450
2	2.9200	4.3026	6.9646	9.9247	14.0887	22.3276	31.5989
3	2.3534	3.1824	4.5407	5.8408	7.4534	10.2145	12.9242
4	2.1319	2.7764	3.7470	4.6041	5.5976	7.1732	8.6103
5	2.0150	2.5706	3.3650	4.0322	4.7734	5.8934	6.8688
6	1.9432	2.4469	3.1426	3.7074	4.3168	5.2076	5.9589
7	1.8946	2.3646	2.9980	3.4995	4.0294	4.7852	5.4079
8	1.8595	2.3060	2.8965	3.3554	3.8325	4.5008	5.0414
9	1.8331	2.2621	2.8214	3.2498	3.6896	4.2969	4.7809
10	1.8124	2.2282	2.7638	3.1693	3.5814	4.1437	4.5869
11	1.7959	2.2010	2.7181	3.1058	3.4966	4.0247	4.4369
12	1.7823	2.1788	2.6810	3.0545	3.4284	3.9296	4.3178
13	1.7709	2.1604	2.6503	3.0123	3.3725	3.8520	4.2208
14	1.7613	2.1448	2.6245	2.9768	3.3257	3.7874	4.1404
15	1.7530	2.1314	2.6025	2.9467	3.2860	3.7328	4.0728
16	1.7459	2.1199	2.5835	2.9208	3.2520	3.6861	4.0150
17	1.7396	2.1098	2.5669	2.8983	3.2224	3.6458	3.9651
18	1.7341	2.1009	2.5524	2.8784	3.1966	3.6105	3.9216
19	1.7291	2.0930	2.5395	2.8609	3.1737	3.5794	3.8834
20	1.7247	2.0860	2.5280	2.8454	3.1534	3.5518	3.8495

α (1 tail)	0.05	0.025	0.01	0.005	0.0025	0.001	0.0005
α (2 tail)	0.1	0.05	0.02	0.01	0.005	0.002	0.001
df							
21	1.7207	2.0796	2.5176	2.8314	3.1352	3.5272	3.8193
22	1.7172	2.0739	2.5083	2.8188	3.1188	3.5050	3.7921
23	1.7139	2.0686	2.4998	2.8073	3.1040	3.4850	3.7676
24	1.7109	2.0639	2.4922	2.7970	3.0905	3.4668	3.7454
25	1.7081	2.0596	2.4851	2.7874	3.0782	3.4502	3.7251
26	1.7056	2.0555	2.4786	2.7787	3.0669	3.4350	3.7067
27	1.7033	2.0518	2.4727	2.7707	3.0565	3.4211	3.6896
28	1.7011	2.0484	2.4671	2.7633	3.0469	3.4082	3.6739
29	1.6991	2.0452	2.4620	2.7564	3.0380	3.3962	3.6594
30	1.6973	2.0423	2.4572	2.7500	3.0298	3.3852	3.6459
31	1.6955	2.0395	2.4528	2.7440	3.0221	3.3749	3.6334
32	1.6939	2.0369	2.4487	2.7385	3.0150	3.3653	3.6218
33	1.6924	2.0345	2.4448	2.7333	3.0082	3.3563	3.6109
34	1.6909	2.0322	2.4411	2.7284	3.0019	3.3479	3.6008
35	1.6896	2.0301	2.4377	2.7238	2.9961	3.3400	3.5912
36	1.6883	2.0281	2.4345	2.7195	2.9905	3.3326	3.5822
37	1.6871	2.0262	2.4315	2.7154	2.9853	3.3256	3.5737
38	1.6859	2.0244	2.4286	2.7115	2.9803	3.3190	3.5657
39	1.6849	2.0227	2.4258	2.7079	2.9756	3.3128	3.5581
40	1.6839	2.0211	2.4233	2.7045	2.9712	3.3069	3.5510

7

What is H_0 (the null hypothesis) that the researcher should use? **Please write your answer using symbols involving equality or inequality.**

8

What is H_A (the alternate hypothesis) that the researcher should use? **Please write your answer using symbols involving equality or inequality.**

9

Accepted characters: numbers, decimal point markers (period or comma), sign indicators (-), spaces (e.g., as thousands separator, 5 000), "E" or "e" (used in scientific notation). **NOTE:** For scientific notation, a period MUST be used as the decimal point marker.

What is the df for the test? ____

10

If the t-statistic is 2.257, and using the chart above, do we reject the null hypothesis (H_0)?

- A. Yes
- B. No

11

Please explain your answer to question 10.

12

Would your answer to question 10 change if a 1% significance level was used instead?

- A. Yes
- B. No

13

Please explain your answer to question 12.

Part 3: Part 3

Data were collected from college students residing in a dorm at a local college regarding their satisfaction with security in the dorm. Responses were given on a 10 point scale, with 1=not at all satisfied and 10=completely satisfied. The data were collected a second time from the same students one month later. An analysis was then conducted to see if there was a change in satisfaction over time. Assume that the distribution of the sample's measurements is normal, and that sample size is adequate. The following tables are provided. Please answer the questions that follow.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Initial Satisfaction Score	6.033		.6841	.06807
	Final Satisfaction Score	5.764		.7215	.07179

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	99% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Initial Satisfaction Score - Final Satisfaction Score	.2683	.5018	.04993		.3994	5.374	100	.000

14

Accepted characters: numbers, decimal point markers (period or comma), sign indicators (-), spaces (e.g., as thousands separator, 5 000), "E" or "e" (used in scientific notation). **NOTE:** For scientific notation, a period MUST be used as the decimal point marker.

What is the α level used in the analysis? ____ **Please express your answer as a decimal with two decimal places.**

15

Accepted characters: numbers, decimal point markers (period or comma), sign indicators (-), spaces (e.g., as thousands separator, 5 000), "E" or "e" (used in scientific notation). **NOTE:** For scientific notation, a period MUST be used as the decimal point marker.

How many people were included in this analysis? ____

16

Is there a significant difference between the initial satisfaction score and the score after 1 month?

- A. Yes
- B. No

17

Please explain your answer to question 16.

18

Using your result from question 16, what could be the lower value of the 99% confidence interval of the difference for the paired sample t-test?

- A. .5762
- B. .1372
- C. -.04691
- D. -2.58

19

Please explain your answer to question 18.

Part 4: Part 4

An independent samples t-test was run to compare the mean hemoglobin A1c (HbA1c) values of adult women with diabetes who exercised for at least 150 minutes a week (considered to be physically active) as compared with those who did not. The following tables are provided. Assume that the distribution of the sample's measurements is normal, and that sample size is adequate. Please answer questions that follow.

Group Statistics

	Physically active	N	Mean	Std. Deviation	Std. Error Mean
HbA1c	Yes		7.35	0.66	0.040
	No		7.40	0.64	0.051

Independent Samples Test

		t-test for Equality of Means	
		98% Confidence Interval of the Difference	
		Lower	Upper
HbA1c	Equal variances assumed	-.179	.078
	Equal variances not assumed	-.178	.077

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
HbA1c	Equal variances assumed	.390	.532	-.776	432		-.203	.065
	Equal variances not assumed			-.783	336.2		-.202	.065

20

Accepted characters: numbers, decimal point markers (period or comma), sign indicators (-), spaces (e.g., as thousands separator, 5 000), "E" or "e" (used in scientific notation). **NOTE:** For scientific notation, a period MUST be used as the decimal point marker.

Report the mean HbA1c for physically active adult women with diabetes ____

21

Accepted characters: numbers, decimal point markers (period or comma), sign indicators (-), spaces (e.g., as thousands separator, 5 000), "E" or "e" (used in scientific notation). **NOTE:** For scientific notation, a period MUST be used as the decimal point marker.

What is the α level used in the analysis? ____ Please express your answer as a decimal with two decimal places.

22

Accepted characters: numbers, decimal point markers (period or comma), sign indicators (-), spaces (e.g., as thousands separator, 5 000), "E" or "e" (used in scientific notation). **NOTE:** For scientific notation, a period MUST be used as the decimal point marker.

How many people were included in this analysis? ____

23

Can we assume equal variances?

- A. Yes
- B. No

24

Please explain your answer to question 23.

25

Is there a significant difference in HbA1c for physically active and physically inactive adult women with diabetes?

- A. Yes
- B. No

26

Please explain your answer to question 25.

27

Using your result from question 25, what could be the significance level (p-value) for the independent samples t-test?

- A. 0 (exactly)
- B. -0.432
- C. 0.438
- D. 0.004

28

Please explain your answer to question 27.