HW 9 - Math 10 Answers

1. Does the home team have an advantage in NBA basketball games? In a study of 75 games, the visiting team points were compared to the home team points. Design and conduct a hypothesis test with a significance level of 5%

(a) (DESIGN) State your Hypothesis

$Ho: \mu_d \geq 0 \quad Ha: \mu_d < 0$

d= visitor score-home score

(b) (DESIGN) State Significance Level of the test and explain Type I error.

$\alpha = .05$ **, the maximum probability of Type I error: we would incorrectly claim that home team scores more points on average than the visiting team.**

(c) (DESIGN) Determine the statistical model (test statistic) Explain your reasoning.

Model: Matched Paired t-test. This model is appropriate because there is dependent sampling.

(d) (DESIGN) Determine decision rule (p-value method)

Reject Ho if p-value < alpha.

(e) (DATA) Conduct the test and **circle** your decision

	Visiting	Home
sample mean	95.47	101.31
sample std dev	12.91	12.72
sample size	75	75

Reported p-values	**two tail**	**lower tail**	**upper tail**
F-test for variances	0.899		
pooled variance t-test	0.006	0.003	0.997
unequal variance t-test	0.006	0.003	0.997
matched pairs t-test	0.000	0.000	1.000

Correct p-value **0.000**

Reject Ho

(f) (CONCLUSION) State your overall conclusion in language that is clear, relates to the original problem and is consistent with your decision.

Home teams have an advantage - they do score more points on average than visiting teams.

2. Do directed reading activities in the classroom help elementary school students improve aspects of their reading ability? A treatment class of 21 third-grade students participated in these activities for eight weeks, and a control class of 23 third-graders followed the same curriculum without the activities. After the eight-week period, students in both classes took a Degree of Reading Power (DRP) test which measures the aspects of reading ability that the treatment is designed to improve. At the 5% level of significance, can you conclude that directed reading activities improved DRP scores?

(a) (DESIGN) State your Hypothesis

$Ho: \mu_1 \le \mu_2 \quad Ha: \mu_1 > \mu_2$

(b) (DESIGN) State Significance Level of the test and explain Type I error.

$\alpha = .05$ **, the maximum probability of Type I error: we would incorrectly claim that directed reading activities improved DRP scores.**

(c) (DESIGN) Determine the statistical model (test statistic) Explain your reasoning.

Model: Unequal variance t-test. This model is appropriate because there is independent sampling and there is a significant difference between the population variances (F-test pvalue=0.049)

(d) (DESIGN) Determine decision rule (pvalue method)

Reject Ho if p-value < alpha.

(e) (DATA) Conduct the test and **circle** your decision

	Treatment	Control
sample mean	51.48	41.52
sample std dev	11.01	17.15
sample size	21.00	23.00

Reported p-values	**two tail**	**lower tail**	**upper tail**
F-test for variances	0.049		
pooled variance t-test	0.029	0.985	0.015
unequal variance t-test	0.034	0.983	0.017
matched pairs t-test	n/a	n/a	n/a

Correct p-value **0.017**

Reject Ho

(f) (CONCLUSION) State your overall conclusion in language that is clear, relates to the original problem and is consistent with your decision.

Directed reading activities in the classroom improved DRP scores, helping elementary school students improve aspects of their reading ability.