MAT 243 Project Two Summary Report

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1. Introduction: Problem Statement

The goal of this statistical research is to test hypothesis or claims made on the relative skill and points of the Rockets in 2013-2015, and to test a claim comparing the Rockets relative skill in 2013-2015 to that of the Bulls in 1996-1998. This analysis will rely on access to a large set of historical data and utilize inferential statistical method of hypothesis testing.

2. Introduction: Your Team and the Assigned Team

Table 1. Information on the Teams

	Name of Team	**Years Picked**
1. Yours	Rockets	2013 - 2015
2. Assigned	Bulls	1996- 1998

3. Hypothesis Test for the Population Mean (I)

Hypothesis testing is generally used to test a claim made on population mean or proportion. The kind of hypothesis test conducted is often determined by whether the population standard deviation is known before the test. The null hypothesis H_0 here is that the average relative skill level of the Rockets is 1342 in 2013-2015. The alternative hypothesis H_a is the claimed made that the Rockets had an average relative skill greater than 1342. At a 5%(alpha=0.05) level of significance, a t-test returned the following test statistic and P-value.

Table 2: Hypothesis Test for the Population Mean (I)

Statistic	**Value**
Test Statistic	97.78
P-value	0.0000

The returned P-value of 0.0000 is lesser than the 0.05 level of significance, providing evidence to reject the null hypothesis and accept the alternative hypothesis that the Rockets had an average relative skill greater than 1342 in 2013-2015. This finding is significant because it is substantiated by the calculated mean relative skill of 1596.29 for the Rockets in 2013-2015.

4. Hypothesis Test for the Population Mean (II)

The null hypothesis H_0 here is that the average number of points scored by the Rockets in 2013-2015 is 110 points, while the alternative hypothesis H_a is the claim that the average number of points scored by the Rockets in 2013-2015 is less than 110 points. At a 1%(alpha=0.01) level of significance a t-test returned the following test statistics and P-value.

Table 3: Hypothesis Test for the Population Mean (II)

Statistic	Value
Test Statistic	-5.39
P-value	0.0000

The returned P-value is also lesser than the level of significance, providing evidence to reject the null hypothesis and accept the alternative hypothesis that the Rockets scored an average point less than 110 in 2013-2015. This test is significant because it is substantiated by the calculated mean points of 105.85 for the Rockets in 2013-2015.

5. Hypothesis Test for the Population Proportion

Hypothesis testing can also be used to test whether a population proportion is the same as a hypothesized or claimed population proportion. The null hypothesis H_0 here is the claim that the proportion of games that the Rockets wins when scoring 80 or more points is 0.50, while the alternative hypothesis is that the proportion of games that the Rockets wins when scoring 80 or more points is not 0.50. At a 5%(alpha=0.05) level of significance, a proportions z-test returned the following test statistics and P-value.

Table 4: Hypothesis Test for the Population Proportion

Statistic	Value
Test Statistic	4.58
P-value	0.0000

Since the returned P-value of 0.000 is lesser than the level of significance, providing evidence to rejects the null hypothesis-the management's claim, and accept the alternative hypothesis that the proportion of games won by the rockets while scoring 80 points or more in 2013-2015 is not 0.5. This test is significant because the calculated proportion of such games for the Rockets in 2013-2015 is 0.6417, which is more than 0.50.

6. Hypothesis Test for the Difference Between Two Population Means

Hypothesis test for the difference between two population is used to ascertain a claim about the differences between two population means. Here the null hypothesis H_0 is that the mean relative skill of the Rockets in 2013-2015 is the same as the mean relative skill of the Bulls in 1996-1998, while the alternative hypothesis H_a is that it is not the same. Using a 1%(alpha=0.01) level of significance, an unpaired t-test returned the following test statistics and P-value.

Table 5: Hypothesis Test for the Difference Between Two Population Means

Statistic	Value
Test Statistic	34.26

Statistic	Value
P-value	0.0000

With a lower P-value than the level of significance, there is enough evidence to reject the null hypothesis, the management's claim that the mean relative skills of both teams are the same for the respective years. With this test, we can accept the null hypothesis that they have different mean relative skill, and this is substantiated by comparing the calculated mean relative skills both teams for their respective time periods (the Rockets: 1596.2; the Bulls: 1739.8).

7. Conclusion

The practical importance of the analyses was to make inferences about the performance of the Rockets in 2013-2015 and test those inferences to make more fact-based conclusions. Based on the results of the four different hypothesis tests conducted, we can conclude the following:

- The Rockets performed above a critically low skill level of 1342 in 2013-2015.
- The Rockets did not likely do very well during the regular season in 2013-2015, averaging only 105.85 points instead of an expected average of 110.
- The Rockets scored 80 points or more in about 65% of the games played in 2013-2015.
- The Bulls had a higher mean relative skill in 1996-1998 than the Rockets had in 2013-2015.