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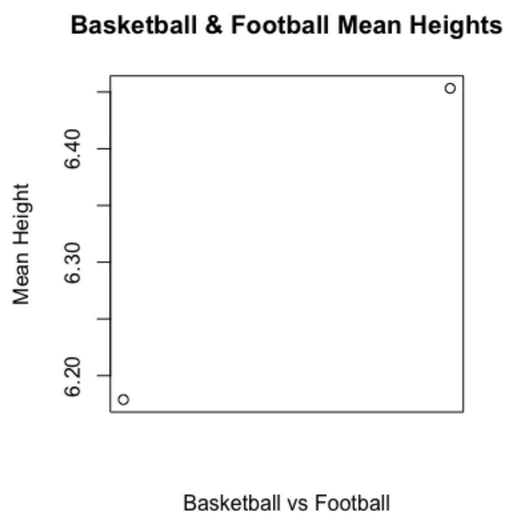
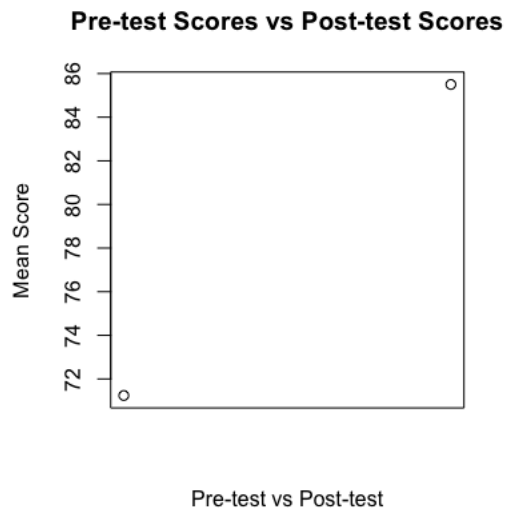
Psych Lab
Project 10

1. My Null Hypothesis would be that NBA = NFL, while the Alternative Hypothesis is that NBA > NFL. NBA players and NFL players will be similar heights on average.
2. Mean of Project10A$HtFt: 6.178 (X)
   Mean of Project10A$HtBk: 6.453 (Y)
   Standard dev of Project10A$HtFt: 0.362
   Standard dev of Project10A$HtBk: 0.310
3. t = -3.8058, df = 84.88, p-value = 0.000266
   alternative hypothesis: true difference in means is not equal to 0
   95 percent confidence interval: -0.4176971 -0.1310251
   The difference is statistically significant. There is a difference in means, therefore the true hypothesis is the alternative hypothesis: the difference in means is not 0, the average heights of players in NFL and NBA are not the same. So we reject the null hypothesis.



4. Well as you can see, the mean heights for both sports are not close. The football is on the left in this diagram, with a mean height below 6.20 while the mean is 6.1. As for the basketball player mean heights it is 6.4 on the upper-right corner which is over the mean height.
5. My Null Hypothesis would be that the Pre-test Score = Post-test Score. For my Alternative Hypothesis, it would be that the Post-test Score > Pre-test Score.
6. Standard Deviation of Project 10B$V1: 9.001 (X)
   Standard Deviation of Project 10B$V2: 9.111 (Y)
   Mean of the Differences: -14.2582
7. t = -9.0913, df = 74, p = $1.119e^{-13}$

It has an insanely low p value, so we must deny the null hypothesis and accept the alternative hypothesis. This is statistically significant because of the small p value and the large t value. There is significant difference between the actual mean and the hypothesized mean.



8. This graph shows the difference in average mean of students on Pre-tests (which is on the left) and Post-tests (which is on the right.) . It shows us that students average mean score on Pre-tests is lower than the average mean score on Post-tests.
9. I think that we can safely say that both of those things are true because from going through the program, student scores drastically increased, with our t value showing a -9.0 difference in scores. Also, our p value is also very low, meaning you must overcome the odds of the very small p value of ($p = 1.119e^{-13}$) that a student will not get a better score after going through the program. So, it's almost as a guarantee to get a better score after the program.
10. The Null Hypothesis would be Group A = Group B = Group C, while the Alternative Hypothesis would be Group A > Group B > group C.
11.

Group	N	Mean	Sd
A	33	14.79	5.384
B	26	10.54	6.107
C	20	9.65	6.459

12.

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Df Sum Sq Mean Sq F value Pr(>F)
Group       2    422   210.9    6.04 0.0037 **
Residuals   76   2653    34.9
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Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
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13.

There is evidence that says there is a significant difference in these groups. The means s hows us that that they fall from the front to the back row. The Standard Deviation grows as well meaning that scores are more spread out from the mean. This means that more students in the front rows had scores closer to the mean than those in the back rows.

14.

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Tukey multiple comparisons of means (TurkeyHSD)
  95% family-wise confidence level

Fit: aov(formula = Score ~ Group, data = Project10C)

$Group
        diff     lwr     upr   p adj
B-A -4.2494 -7.953 -0.5461 0.0205
C-A -5.1379 -9.140 -1.1359 0.0083
C-B -0.8885 -5.089  3.3119 0.8688
```

As the data shows, C-A is significant because of the high difference of lower test scores as well as because of the p-value .0083. C-B isn't significant because it's more than .5 in p-value. Also B-A is significant because of the low p-value.