The FINA Junior World Diving Championships is an elite dive meet where top divers around the world aged 16 to 18 compete. In this worksheet, you will determine if there is a significant difference in the average total

score between divers aged 16, 17, and 18.

An ANOVA difference in means test was conducted on this data, and the results are given below. Based on the ANOVA table, conclude whether there is a difference in means between the average total points scored from divers of different ages.

 Df Sum Sq Mean Sq F value Pr(>F)

factor(Age) 2 71039 35520 16.51 1.41e-07 \*\*\*

Residuals 348 748547 2151

Conclusion: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Pairwise Comparisons:**

Now that we know there is a difference in means, let’s find out which age(s) are statistically different. You will need the table below for some of your calculations.

For the whole sample: n = 39, $\overbar{y}$ = 298.6615, and $s\_{y}$ = 48.95357

|  |  |  |
| --- | --- | --- |
| **Age** | **Sample Size** | **Mean** |
| 16 | 7 | 268.25 |
| 17 | 18 | 305.5861 |
| 18 | 14 | 304.9643 |

**Pairwise Comparisons using Confidence Intervals:**

Use the ANOVA results to find a 95% confidence interval for the difference in mean total points between 16 and 17-year-olds, 17 and 18-year-olds, and 16 and 18-year-olds.

$$CI for μ\_{i}- μ\_{j} = \left( \overbar{y}\_{i}-\overbar{y}\_{j}\right)\pm t^{\*}\sqrt{MSE}\sqrt{\frac{1}{n\_{i}}+\frac{1}{n\_{j}}}$$

Do these confidence intervals contain zero? What do these results imply?

**Pairwise Comparisons using Fisher’s LSD:**

Compute the LSD using α = 0.05 level. $LSD= t^{\*}\sqrt{MSE}\sqrt{\frac{1}{n\_{i}}+\frac{1}{n\_{j}} }$

Based on your result, which age has a significantly different mean total points?

**Pairwise Comparisons using Tukey’s HSD:**

Compute the HSD using α = 0.05 level. $HSD= \frac{q^{\*}}{\sqrt{2}}\sqrt{MSE}\sqrt{\frac{1}{n\_{i}}+\frac{1}{n\_{j}}}$

Based on your result, which age has a significantly different mean total points?