HW5

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# Question 1

# Question 2

##   
## F test to compare two variances  
##   
## data: subper$conc by subper$wash\_type  
## F = 0.47299, num df = 15, denom df = 15, p-value = 0.1585  
## alternative hypothesis: true ratio of variances is not equal to 1  
## 95 percent confidence interval:  
## 0.1652614 1.3537510  
## sample estimates:  
## ratio of variances   
## 0.4729934

# Question 3

No

# Question 4

Mean=2.775 SD= 13.74397

# Question 5

##   
## Paired t-test  
##   
## data: golf$distance[1:40] and golf$distance[41:80]  
## t = 1.277, df = 39, p-value = 0.1046  
## alternative hypothesis: true difference in means is greater than 0  
## 95 percent confidence interval:  
## -0.8864239 Inf  
## sample estimates:  
## mean of the differences   
## 2.775

# Question 6

We fail to reject the null hypotheses that coated balls do not decrease the average driving distance. (P-value=0.1046)

# Question 7

## Part 1 (A)

Can be done with a smaller sample size.

## Part 2 (B)

If we have the same variability for a paired and independent design, we should not use the paired design as we degrees of freedom by doing so.

# Question 8

## Part 1 (A)

## Part 2 (B)

is the observed values for the group j and factor level i.

is the theoretical mean for the level i.

is the the independent error.

## Part 3 (C)

at least one of the differs.

# Question 9

## Part 1 (A)

## Part 2 (B)

# Question 10

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Source of Var | df | Sum of Squares | Mean Square | F | p-value |
| Trtment | 4 | 987.71 | 246.93 | 33.1 | 1.182879e-09 |
| Error | 25 | 186.53 | 7.46 | — | — |
| Total | 29 | 1174.24 | — | — | — |

# Appendix

library(knitr)  
library(ggplot2)  
library(dplyr)  
library(tidyverse)  
library(broom)  
library(splines)  
library(caret)  
library(Matrix)  
library(MASS)  
library(formatR)  
knitr::opts\_chunk$set(echo = FALSE, message = FALSE, warning = FALSE, fig.width = 4,   
 fig.height = 4, tidy = TRUE)  
# Q1  
  
perdata <- read.csv("PermethrinData.csv")  
subper <- filter(perdata, spray\_rate == "1x" & item\_type == "onesie")  
  
  
  
# Q2  
var.test(subper$conc ~ subper$wash\_type, alternative = "two.sided")  
  
# Q4  
golf <- read.csv("GolfBallData.csv")  
  
  
d <- golf$distance[1:40] - golf$distance[41:80]  
mean = mean(d)  
sd = sd(d)  
  
mean  
sd  
  
  
t.test(x = golf$distance[1:40], y = golf$distance[41:80], paired = T, alternative = "greater")  
  
  
3 \* (50.3 - 49.9)^3 + 3 \* (61.1 - 49.9)^2 + 3 \* (38.3 - 49.9)^2  
tabl <- "  
| Source of Var | df | Sum of Squares | Mean Square | F | p-value|  
|---------------|:--:|:--------------:|:-----------:|:---:|:------:|  
| Trtment |4 | 987.71 | 246.93 | 33.1| 1.182879e-09|   
| Error |25 | 186.53 | 7.46 | --- | --- |   
|Total |29 | 1174.24 | --- | --- | --- |  
"  
cat(tabl)