

1. A very small p-value suggests that the differences with respect to the mean of a continuous variable across groups of experimental units is very small.

True
False

2. In the space below, type R code to run a one-way ANOVA, using the `aov()` function. Assume that the response is called *response*, there is one predictor called *predictor*, and the data frame is called *data*.

3. In the code output below, identify the treatment sum of squares, SS_{treat} .

```
In [6]: aov(foamIndx ~ method, data = esp)
```

```
Call:
aov(formula = foamIndx ~ method, data = esp)
```

```
Terms:
          method Residuals
Sum of Squares  4065.180  1716.919
Deg. of Freedom           2          24
```

```
Residual standard error: 8.458032
Estimated effects may be unbalanced
```

4065.180
1716.919
8.458032

4. In the context of one-way ANOVA, the alternative hypothesis for the (full) F-test is:

H_1 : there are no differences with respect to mean of a continuous variable across groups of experimental units

True
False

5. Using the code output below, calculate the (full) F-statistic.

```
In [6]: aov(foamIndx ~ method, data = esp)
```

```
Call:
aov(formula = foamIndx ~ method, data = esp)
```

```
Terms:
          method Residuals
Sum of Squares  4065.180  1716.919
Deg. of Freedom           2          24
```

```
Residual standard error: 8.458032
Estimated effects may be unbalanced
```

28.41262
5.068171
0.4223476
24

6. Using the code output below, calculate the residual standard error, $\hat{\sigma}$.

```
Call:
aov(formula = y ~ f1, data = df1)
```

```
Terms:
          f1 Residuals
Sum of Squares  820.2125  117.1587
Deg. of Freedom           2          247
```

0.6887138
20.25108
0.4743267
410.1062

7. Using the code output below, conduct the (full) F-test. Then, use the result of that test to choose the most accurate statement below.

```
Call:
aov(formula = y ~ f1, data = df1)
```

```
Terms:
          f1 Residuals
Sum of Squares  820.2125  117.1587
Deg. of Freedom           2          247
```

Yes, there is some evidence that there are differences with respect to the mean of the response variable y across the three levels of factor f1.

No, there are not differences with respect to the mean of the response variable y across the three levels of factor f1.