# Linear Regression Questions

TA. Ahmed Almohammed

11/20/2023

**Question 1: When implementing linear regression of some dependent variable $y$ on the set of independent variables $x = (x_1, x_2, ..., x_r)$, where $r$ is the number of predictors, which of the following statements will be true?**

- a. $\epsilon$ is the random interval.
- ***b. Linear regression is about determining the best predicted weights by using the method of ordinary least squares.***
- ***c. The estimators of the regression coefficients define the estimated regression function*** $f(x) = b_0, b_1x_1 + b_2x_2 + ... + b_rx_r$***.***
- ***d.*** $\beta_1, \beta_2, ..., \beta_r$ ***are the regression coefficients.***

**Question 2: In simple linear regression, the value of what shows the point where the estimated regression line crosses the $y$ axis?**

- a. $f$
- ***b.*** $b_0$
- c. $y$
- d. $b_1$

**Question 3: In polynomial regression, your regression function can include nonlinear terms such as $b_2x_1^2$, $b_3x_1^3$ or even $b_4x_1x_2$, $b_5x_1^2x_2$.**

- ***a. True***
- b. False

**Question 4: There are five basic steps when you're implementing linear regression:**

**1. Check the results of model fitting to know whether the model is satisfactory.**

**2. Provide data to work with, and eventually do appropriate transformations.**

**3. Apply the model for predictions.**

**4. Import the packages and classes that you need.**

**5. Create a regression model and fit it with existing data.**

**However, those steps are currently listed in the wrong order. What's the correct order?**

- a. 4, 5, 3, 2, 1
- b. 5, 3, 1, 2, 4
- c. 5, 4, 2, 1, 3
- ***d. 4, 2, 5, 1, 3***

**Question 5: Which of the following are optional parameters to LinearRegression in scikit-learn?**

- ***a. copy_X***
- ***b. fit_intercept***
- c. reshape
- d. fit
- ***e. n_jobs***
- ***f. normalize***

**Question 6: While working with scikit-learn, in which type of regression do you need to transform the array of inputs to include nonlinear terms such as $x^2$?**

- ***a. Polynomial regression***
- b. Simple linear regression
- c. Multiple linear regression

**Question 7: Underfitting occurs when a model can't accurately capture the dependencies among data, usually as a consequence of its own simplicity. True or False?**

- ***a. True.***
- b. False.

**Question 8: Overfitting happens when a model learns both data dependencies and random fluctuations, meaning that the model learns the data too well. True or False?**

- ***a. True***
- b. False

**Question 9: In the mean squared error function or cost function $J$, our task is to find the value of $b_0$ and $b_1$ for which $J(b_0, b_1)$ is:**

- ***a. Minimum***
- b. Maximum