**Q21)** When implementing linear regression of some dependent variable $y$ on the set of independent variables $\mathbf{x} = (x_1, ..., x_r)$, where $r$ is the number of predictors, which of the following statements will be true?

   a) $\beta_0, \beta_1, ..., \beta_r$ are the **regression coefficients**.
   b) Linear regression is about determining the **best predicted weights** by using the **method of ordinary least squares**.

   c) E is the random interval

   d) Both and b

**Answer:** When implementing linear regression, the following statements are true:
1. $\beta_0, \beta_1, ..., \beta_r$ are the **regression coefficients**. These coefficients represent the weights assigned to each independent variable in the linear regression equation. They determine the impact of each predictor on the dependent variable.
2. Linear regression is about determining the **best predicted weights** by using the **method of ordinary least squares**. The goal is to find the weights that minimize the sum of squared differences between the predicted values and the actual values of the dependent variable. This method is commonly used to estimate the coefficients in linear regression.

Therefore, the correct answer is **option 4: Both $\beta_0, \beta_1, ..., \beta_r$ are the regression coefficients, and linear regression is about determining the best predicted weights by using the method of ordinary least squares**.

**Answer: - d) Both a and b**

**Q22)** What indicates that you have a **perfect fit** in linear regression?

   e) The value $R^2 < 1$, which corresponds to SSR = 0
   f) The value $R^2 = 0$, which corresponds to SSR = 1
   g) The value $R^2 > 0$, which corresponds to SSR = 1
   h) The value $R^2 = 1$, which corresponds to SSR = 0

**Answer:**
Regression Performance A larger $R^2$ indicates a better fit and means that the model can better explain the variation of the output with different inputs. The value $R^2 = 1$ corresponds to SSR = 0. That's the perfect fit, since the values of predicted and actual responses fit completely to each other.

The correct answer is option 4: The value $R^2 = 1$, which corresponds to SSR = 0.

In linear regression, $R^2$ (R-squared) is a statistical measure that represents the proportion of the variance in the dependent variable that can be explained by the independent variables. It ranges from 0 to 1, where 0 indicates that the independent variables have no explanatory power, and 1 indicates a perfect fit.

SSR (Sum of Squared Residuals) measures the sum of the squared differences between the observed and predicted values in the regression model. A perfect fit would mean that the predicted values perfectly match the observed values, resulting in SSR = 0.

Therefore, when $R^2 = 1$, it indicates a perfect fit in linear regression, as all the variance in the dependent variable is explained by the independent variables, and there are no residuals or errors in the model.

**Answer- D) The Value $R^2$ = 1, which corresponds to SSR = 0.**

**Q23)** In simple linear regression, the value of **what** shows the point where the estimated regression line crosses the $y$ axis?
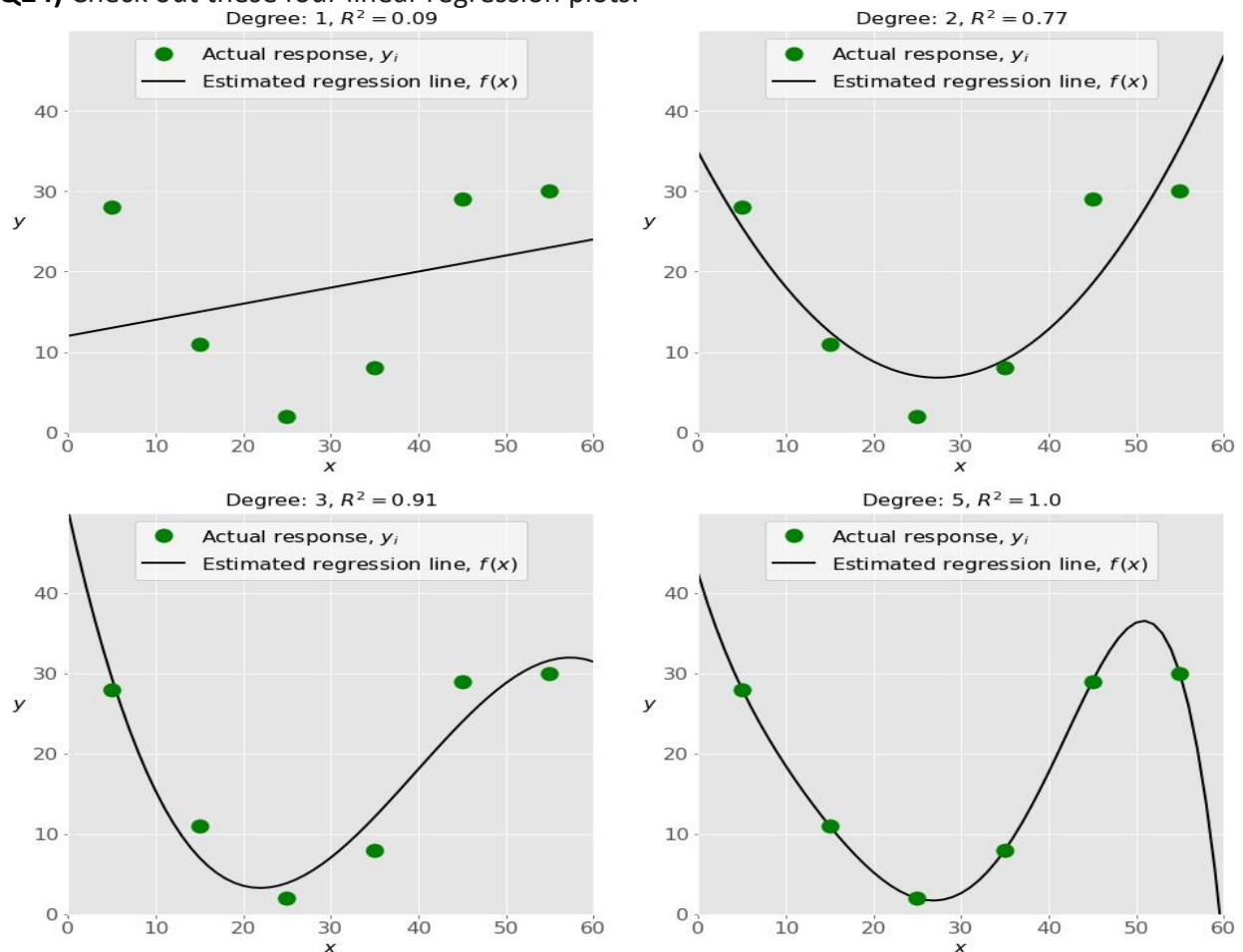
    a) Y
    b) B0
    c) B1
    d) F

**Answer:**

The value that shows the point where the estimated regression line crosses the $y$ axis in simple linear regression is represented by the coefficient B0. So, the correct answer is option 2: B0.

**Answer- b) B0**

**Q24)** Check out these four linear regression plots:

Which one represents an **underfitted** model?

a) The bottom-left plot

b) The top-right plot

c) The bottom-right plot

d) The top-left plot

**Answer: D) The top-left plot**

**Q25**) There are five basic steps when you're implementing linear regression:

- **a.** Check the results of model fitting to know whether the model is satisfactory.
- **b.** Provide data to work with, and eventually do appropriate transformations.
- **c.** Apply the model for predictions.
- **d.** Import the packages and classes that you need.
- **e.** 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)  e, c, a, b, d
b)  e, d, b, a, c
c)  d, e, c, b, a
d)  d, b, e, a, c

**Answer: D) d, b, e, a, c**

**Q26)** Which of the following are optional parameters to Linear Regression in scikit-learn?

a)  Fit
b)  fit_intercept
c)  normalize
d)  copy_X
e)  n_jobs
f)  reshape

**Answer: b) Fit_intercept, c) Normalize, d) Copy_X, e) n_jobs**

**Q27)** 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)    Multiple linear regression

b) Simple linear regression

c) Polynomial regression

**Answer: c) Polynomial regression**

**Q28)** You should choose stats models over scikit-learn when:

A) You want graphical representations of your data.

b) You're working with nonlinear terms.

c) You need more detailed results.

d) You need to include optional parameters.

**Answer: c) You need more detailed results.**


**Q29)** ___is a fundamental package for scientific computing with Python. It offers comprehensive mathematical functions, random number generators, linear algebra routines, Fourier transforms, and more. It provides a high-level syntax that makes it accessible and productive.

d) Pandas

e) Numpy

f) Statsmodel

g) scipy

**Answer: b) Numpy**


**Q30)** _____ is a Python data visualization library based on Matplotlib. It provides a high-level interface for drawing attractive and informative statistical graphics that allow you to explore and understand your data. It integrates closely with pandas' data structures.

h) Bokeh
i) Seaborn
j) Matplotlib
k) Dash

**Answer: b) Seaborn**