Assignment 2:

1. In a binary logistic regression, if **𝑋𝛽**part is 1.5, what will be the predicted probability and what will be the corresponding ‘logit’ value?

|  |  |  |
| --- | --- | --- |
|  | A. | [0.80, 0.82] and [1.95, 2.00] |
|  | B. | [0.80, 0.82] and [1.45, 1.50] |
|  | C. | [0.70, 0.72] and [1.95, 2.00] |
|  | D. | None of the above |

**2 points**

**QUESTION 2**

1. Which marital status works best for selling term deposits (use the training dataset to answer this question)?

|  |  |  |
| --- | --- | --- |
|  | A. | Divorced |
|  | B. | Married |
|  | C. | Single |
|  | D. | None of the above |

**2 points**

**QUESTION 3**

1. What is your interpretation for the age variable on selling the term deposits (use the training dataset to answer this question)?

|  |  |  |
| --- | --- | --- |
|  | A. | A unit increase in age results in ~0.30 increase in log odds of a sale |
|  | B. | A unit increase in age results in ~0.023 increase in log odds of a sale |
|  | C. | A unit increase in age results in ~0.023 increase in the odds of sale |
|  | D. | None of the above |

**2 points**

**QUESTION 4**

1. What can you say about the probability of selling term deposits to those that have a housing loan as opposed to those that do not have one (use the training dataset to answer this question)?

|  |  |  |
| --- | --- | --- |
|  |  | Greater |
|  |  | Smaller |
|  |  | The probabilities are statistically indistinguishable |
|  |  | None of the above |

**2 points**

**QUESTION 5**

1. What can you say about the impact of the duration of last call on the log odds of selling a term deposit (use the training dataset to answer this question)?

|  |  |  |
| --- | --- | --- |
|  | A. | There is a significant positive impact on log odds |
|  | B. | There is a significant negative impact on log odds |
|  | C. | There is no significant impact |
|  | D. | None of the above |

**2 points**

**QUESTION 6**

1. What is the probability of selling the term deposit to a customer with a profile of age 30, single, with housing loan, and duration of last contact being 400 secs?

|  |  |  |
| --- | --- | --- |
|  | A. | [0.16, 0.165] |
|  | B. | [0.17, 0.18] |
|  | C. | [0.19, 0.20] |
|  | D. | None of the above |

**2 points**

**QUESTION 7**

1. What is the probability of selling the long-term deposit to a customer with a profile of age 60, single, without house, and duration of last contact 100 seconds?

|  |  |  |
| --- | --- | --- |
|  | A. | [0.5, 0.7] |
|  | B. | [0.01, 0.09] |
|  | C. | [0.10, 0.11] |
|  | D. | None of the above |

**2 points**

**QUESTION 8**

1. What is the log odds (logit) of selling the long-term deposit to a customer with a profile of age 50, married, with house, and duration of last contact 200 seconds?

|  |  |  |
| --- | --- | --- |
|  | A. | [-3, -2] |
|  | B. | [2, 3] |
|  | C. | [exp(2), exp(3)] |
|  | D. | None of the above |

**2 points**

**QUESTION 9**

1. What is the prediction accuracy of the Logistic Regression (use the validation dataset to answer this)?

|  |  |  |
| --- | --- | --- |
|  | A. | [86%, 87%] |
|  | B. | [88%, 90%] |
|  | C. | [91%, 95%] |
|  | D. | None of the above |

**2 points**

**QUESTION 10**

1. What can you say about odds ratio?

|  |  |  |
| --- | --- | --- |
|  | A. | It can be between -Inf and +Inf. |
|  | B. | It is always between 0 and 1. |
|  | C. | It is always between 0 and +Inf. |
|  | D. | None of the above |

**2 points**

**QUESTION 11**

1. Which of the following is the main advantage of Bass model?

|  |  |  |
| --- | --- | --- |
|  | A. | It is more accurate than the modified exponential model |
|  | B. | It is useful to forecast market adoption based on the sales behavior of analogous products given an estimate of the market size |
|  | C. | It is easy to use |
|  | D. | None of the above |

**2 points**

**QUESTION 12**

1. One of the following is a key disadvantage of the Bass model:

|  |  |  |
| --- | --- | --- |
|  | A. | It cannot predict individual brand-level adoption |
|  | B. | It is not as good as the modified exponential curve |
|  | C. | At least a small number of prior sales data is required to forecast sales |
|  | D. | None of the above |

**2 points**

**QUESTION 13**

1. What happens when one underestimates the coefficient of innovation of the potential market?

|  |  |  |
| --- | --- | --- |
|  | A. | The shape of the Bass curve does not change at all |
|  | B. | The product sales peak is postponed in reality |
|  | C. | The product sales peak will occur sooner than expected |
|  | D. | None of the above |

**2 points**

**QUESTION 14**

1. Using the historical sales data and a linear regression to estimate the Bass model parameters, what will be your prediction of the total market size (in millions)?

|  |  |  |
| --- | --- | --- |
|  | A. | [245, 248] |
|  | B. | [249, 251] |
|  | C. | 280 |
|  | D. | None of the above |

**2 points**

**QUESTION 15**

1. What is the estimated coefficient of innovation based on historical sales data?

|  |  |  |
| --- | --- | --- |
|  | A. | [0.015,0.0175] |
|  | B. | [0.006,0.008] |
|  | C. | [0.018,0.021] |
|  | D. | None of the above |

**2 points**

**QUESTION 16**

1. What is the estimated coefficient of imitation based on the historical sales data?

|  |  |  |
| --- | --- | --- |
|  | A. | [0.395, 0.410] |
|  | B. | [0.350, 0.385] |
|  | C. | [0.450, 0.499] |
|  | D. | None of the above |

**2 points**

**QUESTION 17**

1. What can you say about the sales growth owing to innovation (i.e. influence of ‘p’)?

|  |  |  |
| --- | --- | --- |
|  | A. | It shows a steady increase until the entire market is captured |
|  | B. | It shows a steady decline |
|  | C. | It shows a rapid increase in the first few years and then a gradual decline |
|  | D. | None of the above |

**2 points**

**QUESTION 18**

1. What can you say about the sales growth owing to imitation (i.e. influence of ‘q’)?

|  |  |  |
| --- | --- | --- |
|  | A. | It shows a steady increase until the entire market is captured |
|  | B. | It shows a steady decline |
|  | C. | It shows an increase until a peak is reached after which it declines |
|  | D. | None of the above |

**2 points**

**QUESTION 19**

1. What is Bass model prediction of sales for the year 2016 in millions based on historical sales data?

|  |  |  |
| --- | --- | --- |
|  | A. | [12.9, 13.3] |
|  | B. | [11.0, 12.3] |
|  | C. | [14.5, 15.0] |
|  | D. | None of the above |

**2 points**

**QUESTION 20**

1. What is the Bass model prediction of cumulative sales in millions for the year 2017?

|  |  |  |
| --- | --- | --- |
|  | A. | [231, 232] |
|  | B. | [233, 237] |
|  | C. | [238, 240] |
|  | D. | None of the above |