

**MATH-321 Statistics II - Fall 2021**

**Homework 3**

The cost of a TV commercial depends on the time that it lasts. The advertising manager of a large company defined the following two variables: : the length of the commercial during a football match and : the viewers’ level of remembrance of the commercial. In order to evaluate the correlation of these two variables the manager ran a commercial of different length of time during a football match in many TV stations. The manager selected a random sample of 24 viewers who watched the football match. Let  be the length of each commercial in seconds. Let  be the level of remembrance of the viewers in each group as a percentage of correct answers. The data are given below. A regression model was run, with  as the dependent variable and  as the independent variable.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Viewer |  |  |  | Viewer |  |  |  | Viewer |  |  |
| 1 | 14 | 42 | 9 | 24 | 33 | 17 | 14 | 33 |
| 2 | 18 | 50 | 10 | 18 | 25 | 18 | 25 | 44 |
| 3 | 38 | 48 | 11 | 34 | 40 | 19 | 26 | 40 |
| 4 | 30 | 40 | 12 | 33 | 48 | 20 | 42 | 50 |
| 5 | 27 | 36 | 13 | 20 | 40 | 21 | 22 | 51 |
| 6 | 32 | 45 | 14 | 42 | 45 | 22 | 32 | 39 |
| 7 | 40 | 54 | 15 | 26 | 45 | 23 | 35 | 55 |
| 8 | 28 | 51 | 16 | 21 | 44 | 24 | 15 | 40 |

1. Write the sample estimated regression equation of this model.
2. Use the sample estimated regression equation to compute the predicted level of remembrance for a viewer who watched a 30-second commercial during a football game.
3. Find the value of the coefficient of determination for this regression model.
4. Find the value of the correlation coefficient between a viewers’ level of remembrance and the length of a commercial during a football game.
5. Compute the explained deviation for viewer 4 in the sample.
6. Compute the unexplained deviation for viewer 18 in the sample.
7. Compute the total deviation for viewer 12 in the sample.