**I. Pen-and-paper**

1. First, we transformed the design matrix using the basis function

Then, we will calculate the vector W that minimizes the square-error loss function, this vector is given by the following expression

So, for the training dataset we obtain that

1. To measure the differences between the observed values and the predictions given by the model, in order to test it, we’ll use the RMSE

For that we’ll need to calculate the predictions of our model:

Each prediction is given by the following polynomial regression model

Therefore, the RMSE is:

1. Answer 3
2. Answer 4

**II. Programming and critical analysis**

1. Answer 5
2. Answer 6
3. Answer 7

**III. APPENDIX**

Paste your programming code here using Consolas 9pt or 10pt.

Use **highlighting** or colored text to facilitate the analysis by your faculty hosts.

**END**