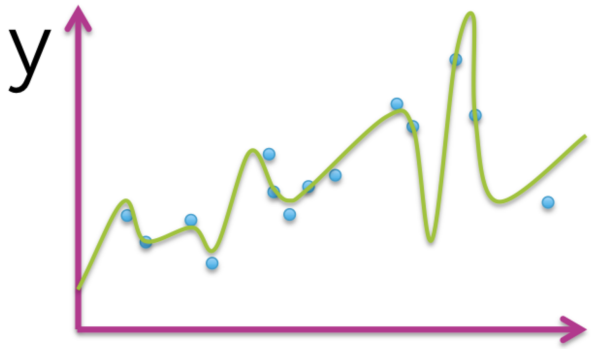
Regression Quiz

Q1: Which figure represents an overfitted model?

A:



Q2: *True or false:* The model that best minimizes training error is the one that will perform best for the task of prediction on new data.

A: False. More explanation:

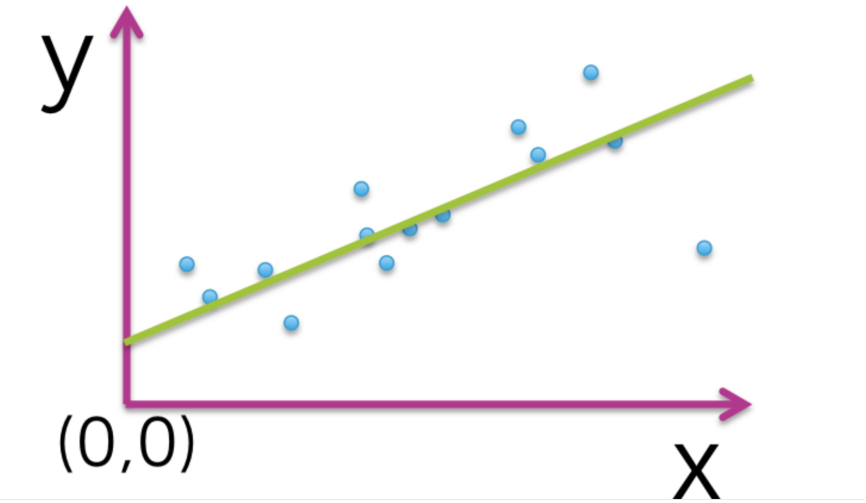
> Training and Testing Errors
>
> You have some data \(X_1,\ldots,X_p,Y\): the variables \(X_1,\ldots,X_p\) are called predictors, and \(Y\) is called a response. You're interested in the relationship that governs them So you posit that \(Y|X_1,\ldots,X_p \sim P_\theta\), where \(\theta\) represents some unknown parameters. This is called regression model for \(Y\)
>
> https://www.stat.cmu.edu/~ryantibs/statcomp-F16/lectures/train_test.html

Q3: The following table illustrates the results of evaluating 4 models with different parameter choices on some data set. Which of the following models fits this data the best.

Model index	Parameters (intercept, slope)	Residual sum of squares (RSS)
1	(0,1.4)	20.51
2	(3.1,1.4)	15.23
3	(2.7, 1.9)	13.67
4	(0, 2.3)	18.99

A: Model 3, smallest RSS.

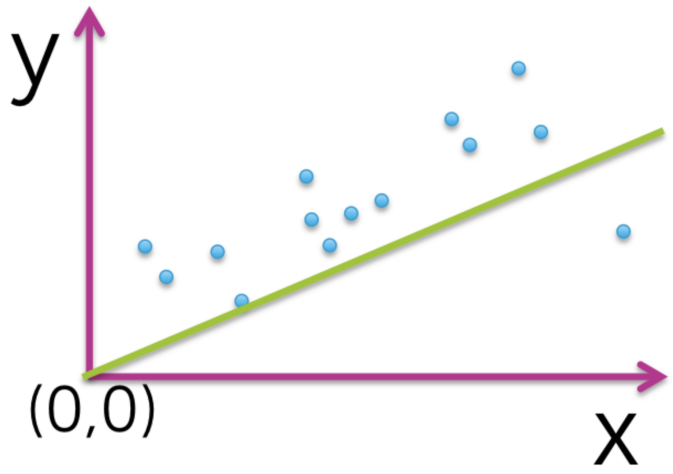
Q4: Assume we fit the following quadratic function: f(x) = w0+w1*x+w2*(x^2) to the dataset shown (blue circles). The fitted function is shown by the green curve in the picture below. Out of the 3 parameters of the fitted function (w0, w1, w2), which ones are estimated to be 0? *(Note: you must select all parameters estimated as 0 to get the question correct.)*



A: W2, linear regression with out going through (0, 0). So w2 is 0.

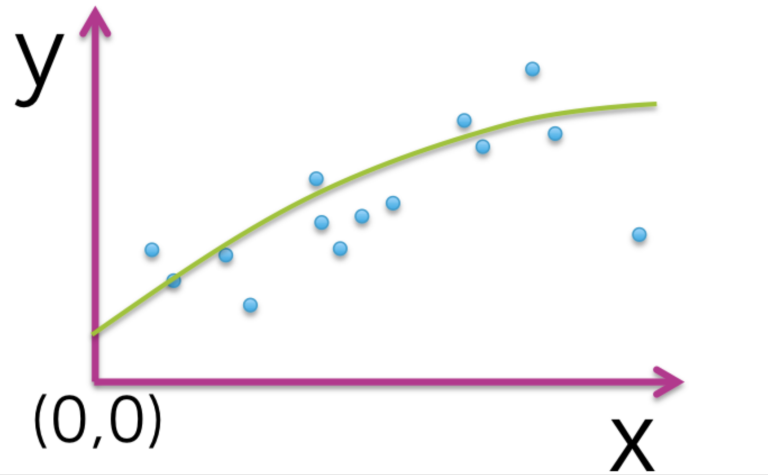
Q5: Assume we fit the following quadratic function: f(x) = w0+w1*x+w2*(x^2) to the dataset shown (blue

circles). The fitted function is shown by the green curve in the picture below. Out of the 3 parameters of the fitted function (w0, w1, w2), which ones are estimated to be 0? *(Note: you must select all parameters estimated as 0 to get the question correct.)*



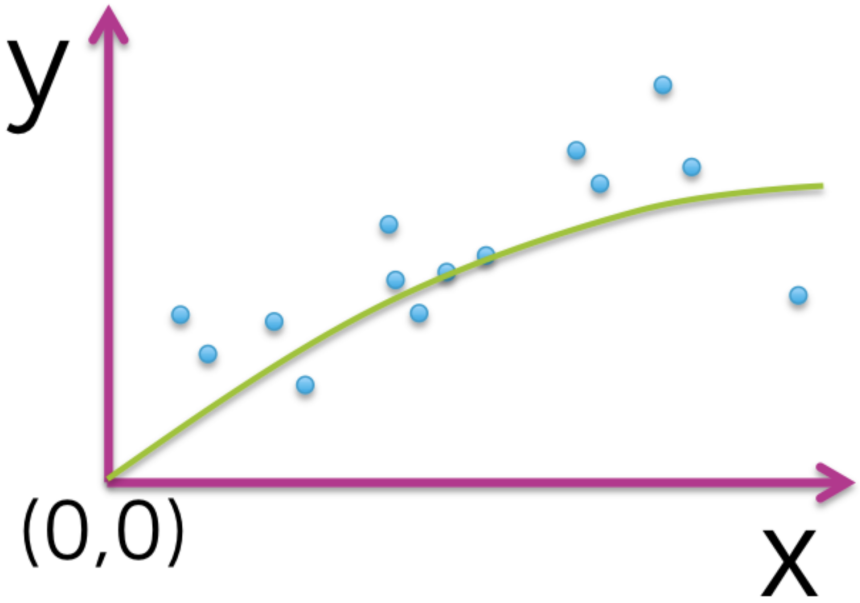
A: W0, W2, linear regression going through (0, 0).

Q6: Assume we fit the following quadratic function: f(x) = w0+w1*x+w2*(x^2) to the dataset shown (blue circles). The fitted function is shown by the green curve in the picture below. Out of the 3 parameters of the fitted function (w0, w1, w2), which ones are estimated to be 0? *(Note: you must select all parameters estimated as 0 to get the question correct.)*



A: None of the above. Quandrtic curve not going through (0, 0).

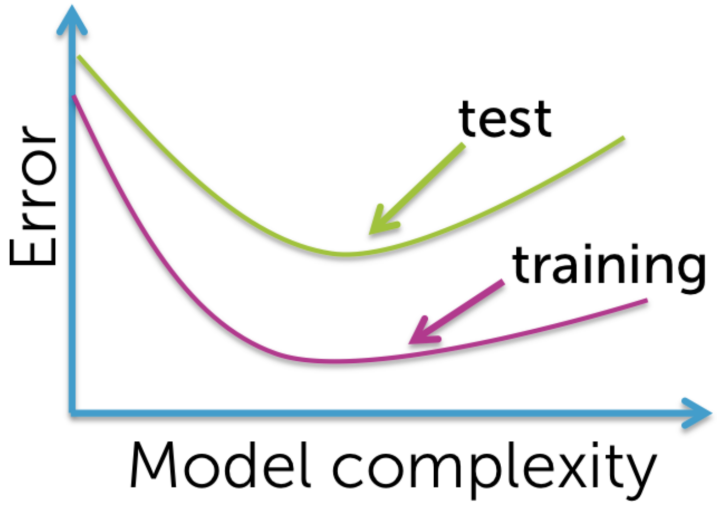
Q7: Assume we fit the following quadratic function: f(x) = w0+w1*x+w2*(x^2) to the dataset shown (blue circles). The fitted function is shown by the green curve in the picture below. Out of the 3 parameters of the fitted function (w0, w1, w2), which ones are estimated to be 0? *(Note: you must select all parameters estimated as 0 to get the question correct.)*



A: W0, Quandrtic curve going through (0, 0).

Q8

A:



Read more here:

https://www.samlau.me/test-textbook/ch/15/bias_cv.html

Q9: *True or false:* One always prefers to use a model with more features since it better captures the true underlying process.

A: False.