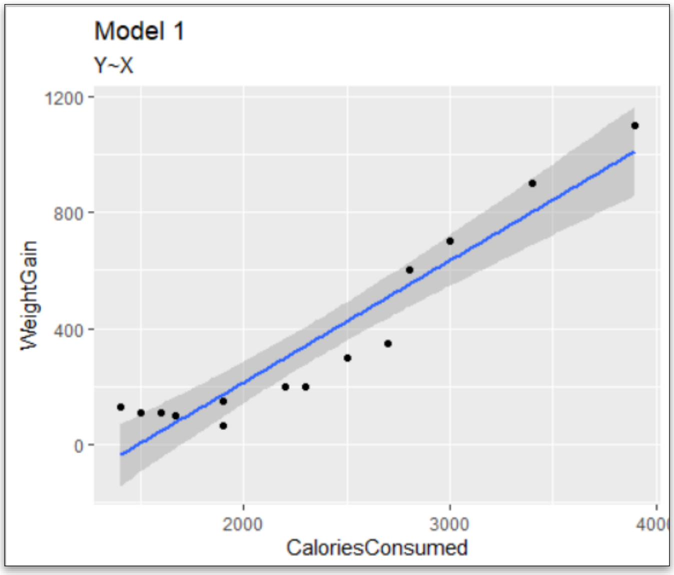
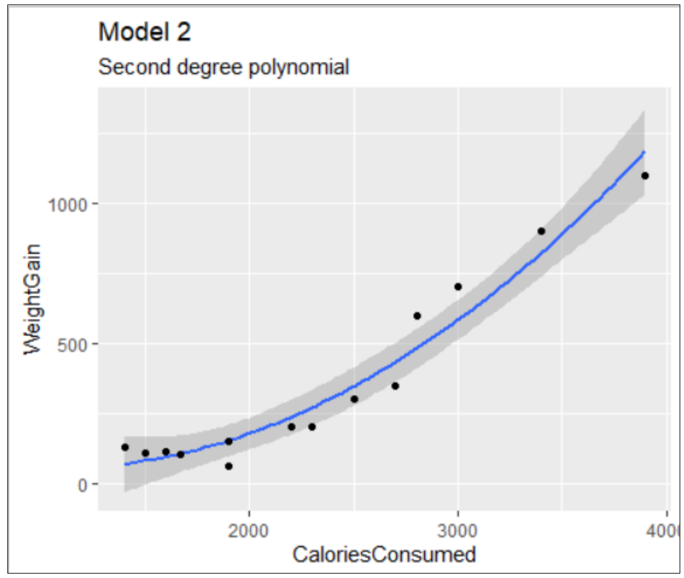
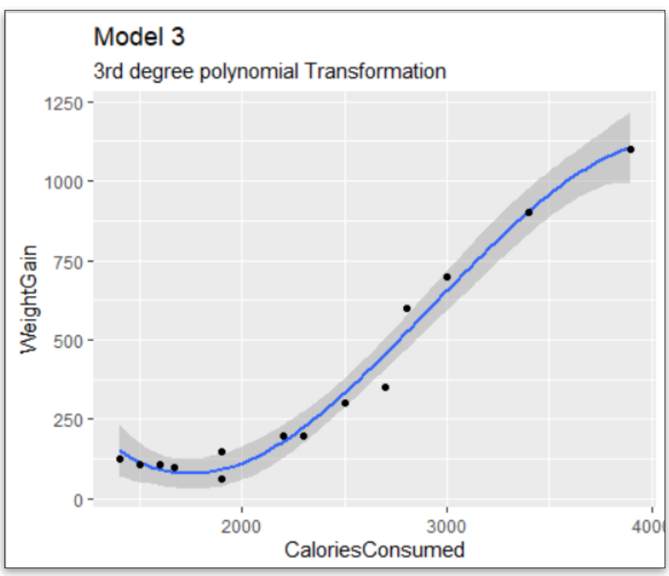
Q1: Calories_consumed-> predict weight gained using calories consumed

- Target variable is Weight Gain and independent variable is Calories consumed

Model	Y WeightGain	X CaloriesConsumed	Correlation (between X and Y)	R-Square	Correlation (between Y and Yhat)	RMSE
1	Y	X	0.946991	0.8968	0.94699	103.3025
2	Y	poly(X,2)	--	0.9521	0.9757338	70.40752
3	Y	poly(X,3)	--	0.9811	0.9905292	44.15011







Conclusion :

Now in our final model we are taking the 3 degree polynomial transformation of the X.

Our Model becomes

$$Y = \beta_0 + \beta_1 X + \beta_2 X^2 + \beta_3 X^3$$

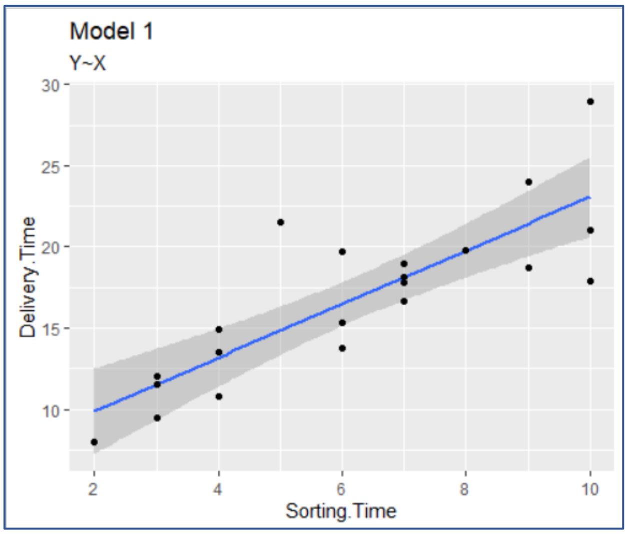
We get the High R^2 value and lower RMSE value in our model 3

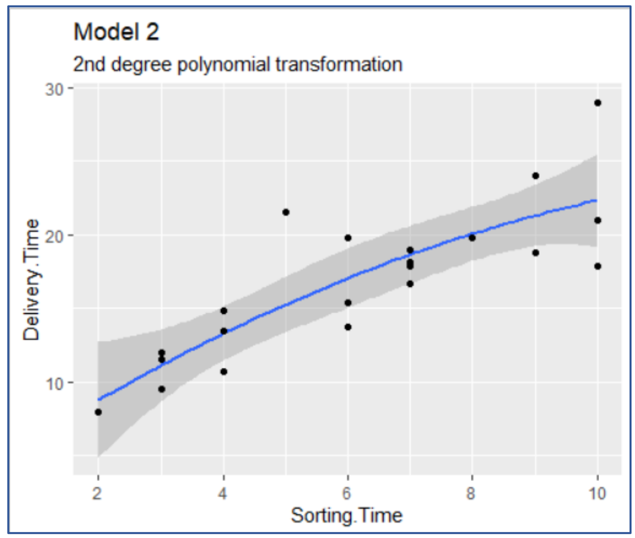
Coefficients	Value
ß0 (Intercept)	357.71
ß1 (Slope)	1139.37
ß2 (Slope)	282.84
ß3 (Slope)	-205.21

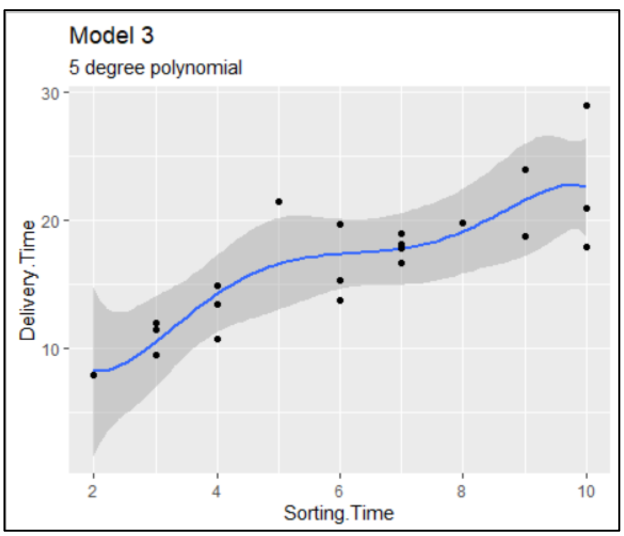
Q2: Delivery_time -> Predict delivery time using sorting time

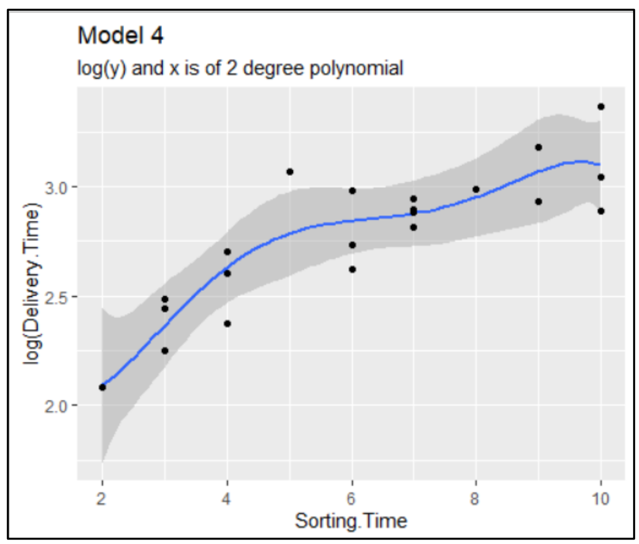
Target variable is DeliveryTime, and Independent variable is SortingTime

Model	Y DeliveryTime	X SortingTime	Correlation (between X and Y)	R-Square	Correlation (between Y and Yhat)	RMSE
1	Y	X	0.825599	0.6823	0.825997	2.79165
2	Y	poly(X,2)	--	0.6934	0.8327302	2.742148
3	Y	ploy(X,5)	--	0.7142	0.845121	2.6475
4	log(Y)	poly(X,2)	--	0.7649	0.8244099	2.799042









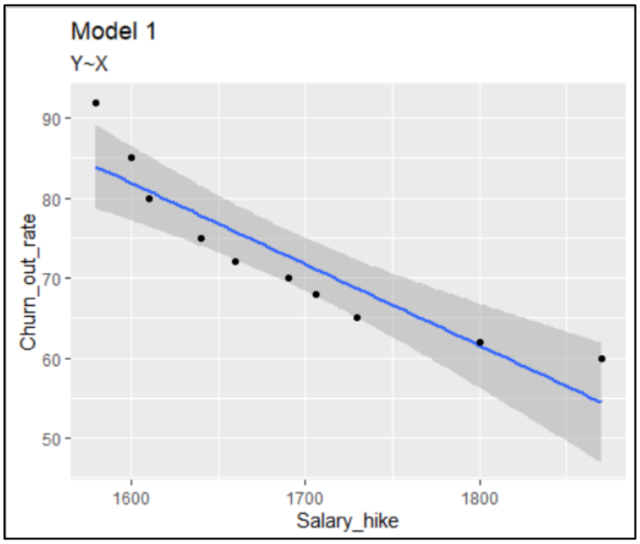
Conclusion :
Although in model 3 we consider 5 degree polynomial and get higher R^2 value and least RMSE value, we are not going to accept the model as the X^3,X4, and X5 are insignificant in this model.
So we may consider the 4th model which has significant variable consideration.
Our model is : $\log(Y) = ß_0 + ß_1 X + ß_2 X^2$.
Or we can say : $Y = \exp(ß_0 + ß_1 X + ß_2 X^2)$

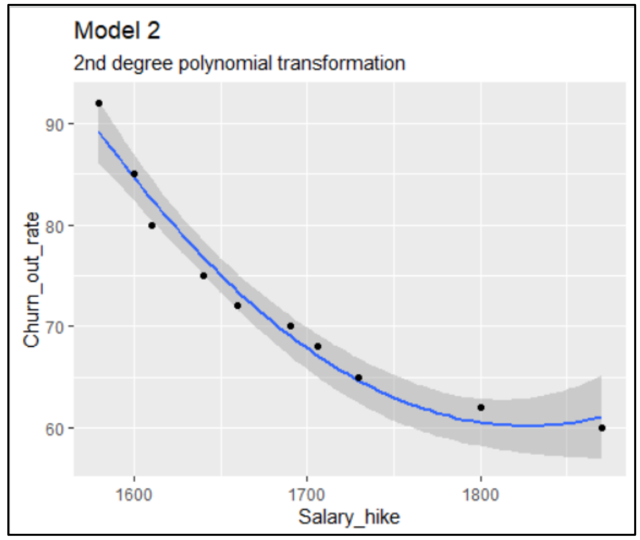
Coefficients	Value
ß0 (Intercept)	2.77479
ß1 (Slope)	1.19994
ß2 (Slope)	-0.33045

Q3: Emp_data -> Build a prediction model for Churn_out_rate

Target variable is "Churn out rate", and Independent variable is "Salary hike"

Model	Y Churn out rate	X Salary hike	Correlation (between X and Y)	R-Square	Correlation (between Y and Yhat)	RMSE
1	**Y**	**X**	**-0.9117216**	**0.8312**	**0.9117216**	**3.997528**
2	**Y**	**poly(X,2)**	**--**	**0.9737**	**0.9867**	**1.5779**





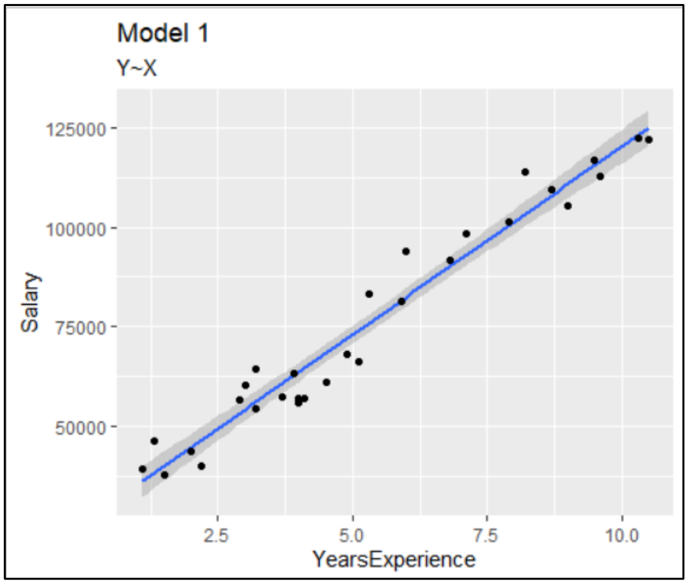
Conclusion :
Here we will consider our second model which is with higher coefficient of determination, as well as least RMSE value. All the considered variables of the second degree polynomial i.e. X and X^2 are significant in this model.
Our model is : $Y = ß_0 + ß_1 X + ß_2 X^2$.

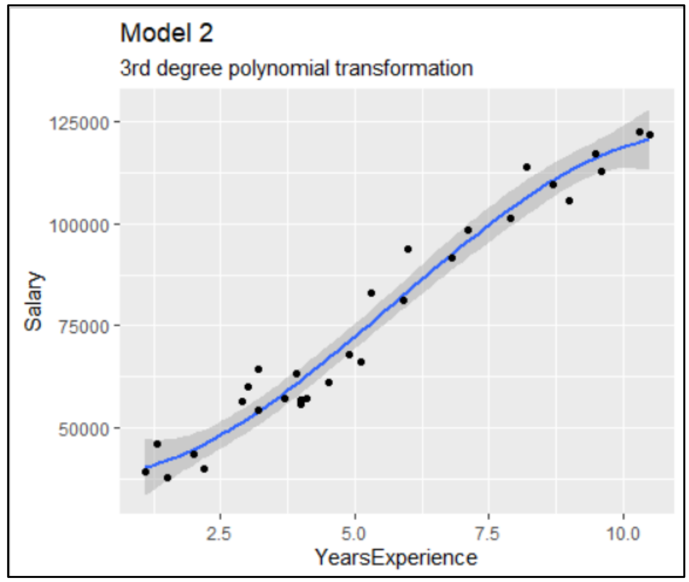
Coefficients	Value
ß0 (Intercept)	**72.9**
ß1 (Slope)	**-28.0553**
ß2 (Slope)	**11.6147**

Q4: Salary_hike -> Build a prediction model for Salary_hike

Target variable is " Salary", and Independent variable is " YearsExperience"

Model	Y Salary	X YearsExperience	Correlation (between X and Y)	R-Square	Correlation (between Y and Yhat)	RMSE
1	Y	X	0.9782416	0.957	0.9782	5592.044
2	Y	poly(X,2)	--	0.9636	0.9816	5142.642





Conclusion :

Here we will consider our First model. Although we are getting higher R^2 in the 2nd model, as well as lower RMSE value, but we can see that variable X^2 is insignificant in this model, although X^3 is significant variable in this model.

Without any transformation also we are getting 0.95 coefficient of determination

Our model is : $Y = ß_0 + ß_1 X$.

Coefficients	Value
ß0 (Intercept)	25792.2
ß1 (Slope)	9450