

## Appendix

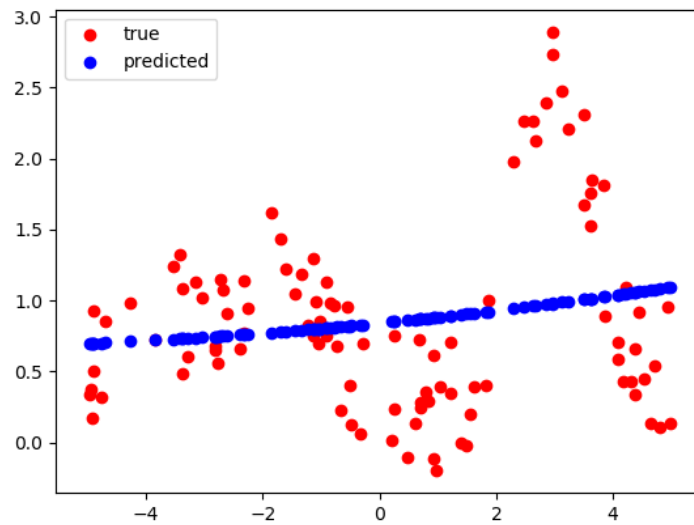
2.

(a)

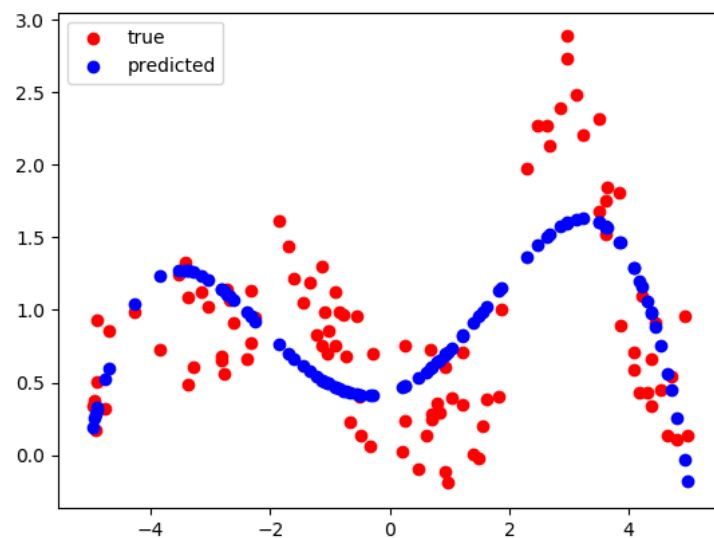
Output

```
Least squares error on original data: 116.87137621050759
Least squares error on augmented data with degree 2: 43.305010550982146
Least squares error on augmented data with degree 4: 26.083682474640515
Least squares error on augmented data with degree 6: 18.52122915109212
```

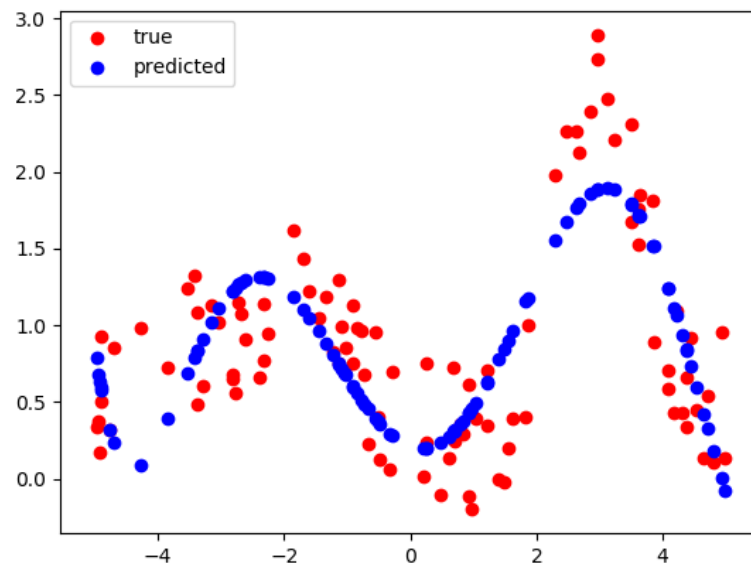
Degree 2 plot:



Degree 4 plot:



Degree 6 plot:

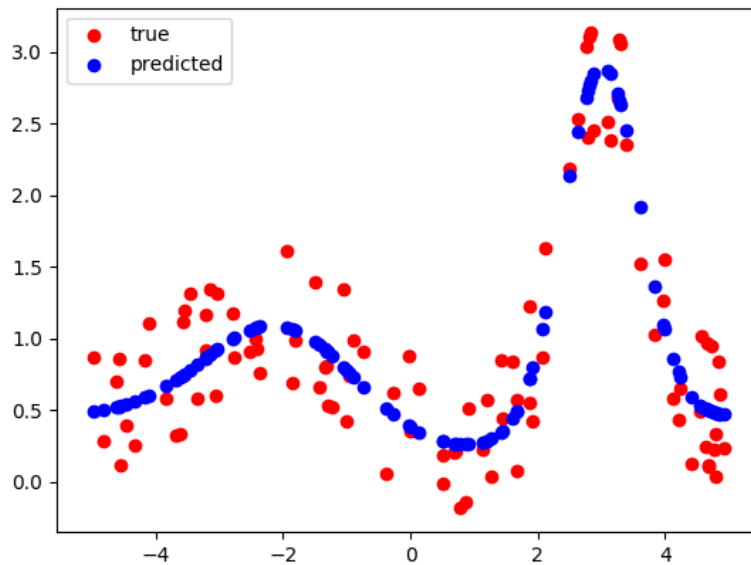


(b)

Output:

Least squares error on augmented data with Gaussian function: 8.705852156559082

Plot:



5.

(e)

```
Coefficients:
[[ 202.31845431 162.41956802 149.07075034]
 [-27.66555164 -17.88905339 -12.92356688]
 [-5.15203925 -4.51375871 -4.24262639]
 [-1.08629293  0.42947012  1.15475569]
 [-3.14053107 -3.70269907 -3.74382934]
 [ 23.67671768 23.15698002 21.94638397]
 [-3.82167171  0.57606634  1.81637483]
 [ 4.7346737  1.4677692 -1.12253649]
 [-9.72739616 -5.75691108 -4.8395598  ]]
```



(f)

```
Coefficients:
[[ 2.13318421e+02  1.70780299e+02  1.57126297e+02]
 [-3.23046362e+01 -2.02975310e+01 -1.45516114e+01]
 [-4.31689131e+00 -3.80778081e+00 -4.83616306e+00]
 [-4.89811386e+00 -3.37684058e+00 -1.14207091e+00]
 [-7.05901066e+03 -7.39934207e+03 -4.26448732e+03]
 [-3.05378224e+02 -1.56329401e+02  3.50285345e+02]
 [-9.76079364e+00 -5.33182216e+00 -1.55699782e+00]
 [ 7.30792588e+02  3.52130316e+02 -6.11683200e+02]
 [-9.08887079e+00 -3.84309477e+00 -4.16456437e+00]]
```



(g)

```
Coefficients:  
[[ 209.38212459 169.03666402 155.36677288]  
 [-30.26805402 -20.30443706 -15.20472049]  
 [-5.753416 -5.07881542 -4.78144904]  
 [-1.05630713 0.46377951 1.19195587]  
 [-7.90569522 -8.20316831 -8.05137623]  
 [ 54.96251667 52.62398401 50.09265545]  
 [-3.8491927 0.55663535 1.80236903]  
 [ 7.32655583 3.83064183 1.07500107]  
 [-10.90665749 -6.8522162 -5.87526417]]
```

