

E94116229 沈延朝

①

```
(a)
y = 6.6912 * x^2 + -1.8837 * x + 3.0864
Error = 0.00525

(b)
y = 22.8245 * e^(0.3867 * x)
Error = 74.36079

(c)
y = 6.2335 * x^2.0202
Error = 0.01027
```

②

2. Least squares polynomial on $[-1,1]$: $0.498144 + 0.092053x + -0.231792x^2$

③

```
(a)
a0 = 0.4592
a1 = -0.1468 , b1 = 0.2323
a2 = 0.0546 , b2 = -0.1249
a3 = -0.0389 , b3 = 0.0829
a4 = 0.0335 , b4 = -0.0609
(b)
Ans: 0.2296
```

```
(c)


| x       | f(x)   | S4(x)   | point_err |
|---------|--------|---------|-----------|
| -3.1416 | 0.0000 | 0.5034  | 3.1416    |
| -2.9389 | 0.0000 | 0.2910  | 2.9712    |
| -2.7362 | 0.0003 | 0.0931  | 2.8007    |
| -2.5335 | 0.0009 | -0.0360 | 2.6303    |
| -2.3309 | 0.0021 | -0.0760 | 2.4599    |
| -2.1282 | 0.0042 | -0.0456 | 2.2895    |
| -1.9255 | 0.0072 | 0.0114  | 2.1190    |
| -1.7228 | 0.0114 | 0.0523  | 1.9486    |
| -1.5201 | 0.0170 | 0.0570  | 1.7782    |
| -1.3174 | 0.0241 | 0.0338  | 1.6078    |
| -1.1148 | 0.0330 | 0.0093  | 1.4373    |
| -0.9121 | 0.0437 | 0.0075  | 1.2669    |
| -0.7094 | 0.0566 | 0.0352  | 1.0965    |
| -0.5067 | 0.0716 | 0.0786  | 0.9261    |
| -0.3040 | 0.0890 | 0.1156  | 0.7556    |
| -0.1013 | 0.1089 | 0.1316  | 0.5852    |
| 0.1013  | 0.1315 | 0.1299  | 0.4148    |
| 0.3040  | 0.1568 | 0.1288  | 0.2444    |
| 0.5067  | 0.1849 | 0.1483  | 0.0739    |
| 0.7094  | 0.2161 | 0.1951  | 0.0965    |
| 0.9121  | 0.2503 | 0.2575  | 0.2669    |
| 1.1148  | 0.2876 | 0.3133  | 0.4373    |
| 1.3174  | 0.3282 | 0.3455  | 0.6078    |
| 1.5201  | 0.3720 | 0.3562  | 0.7782    |
| 1.7228  | 0.4190 | 0.3679  | 0.9486    |
| 1.9255  | 0.4695 | 0.4089  | 1.1190    |
| 2.1282  | 0.5232 | 0.4934  | 1.2895    |
| 2.3309  | 0.5803 | 0.6060  | 1.4599    |
| 2.5335  | 0.6407 | 0.7036  | 1.6303    |
| 2.7362  | 0.7044 | 0.7347  | 1.8007    |
| 2.9389  | 0.7713 | 0.6662  | 1.9712    |
| 3.1416  | 0.8415 | 0.5034  | 2.1416    |



f(x) Integral: 0.2232 , S4(Z) Integral: 0.2296



Absolute Error: 0.0064 , Relative Error: 2.8482%



(d)



Square Error: 0.5056


```