HW8

8-1

```
@PYH530 ➜ /workspaces/E94101216_HW8 (main) $ /home/codespace/.python/current/bin/python /workspaces/E94101216_HW8/HW1.PY
a. Quadratic Approximation:
   y = 6.6912x^2 + -1.8837x + 3.0864
   Error: 0.0052

b. Exponential Approximation:
   y = 22.8245 * exp(0.3867 * x)
   Error: 74.3608

c. Power Function Approximation:
   y = 6.2335 * x^2.0202
   Error: 0.0103
```

8-2

```
@PYH530 ➜ /workspaces/E94101216_HW8 (main) $ /home/codespace/.python/current/bin/python /workspaces/E94101216_HW8/HW2.PY
Least Squares Polynomial Approximation of Degree 2:
a = 0.498279
b = 0.326548
c = -0.232631
P2(x) = 0.498279 + 0.326548x + -0.232631x^2
```

8-3

```
@PYH530 ➜ /workspaces/E94101216_HW8 (main) $ /home/codespace/.python/current/bin/python /workspaces/E94101216_HW8/HW3.PY
=== (a) Trigonometric Polynomial Coefficients ===
a_0 = 0.459205
a_1 = -0.146756
a_2 = 0.054608
a_3 = -0.038929
a_4 = 0.033542
b_1 = 0.232287
b_2 = -0.124941
b_3 = 0.082932

=== (b) Integral ∫₀¹ S₄(x) * sin(4πx) dx ===
-0.062471

=== (c) Integral ∫₀¹ f(x) * sin(4πx) dx ===
-0.065405

=== (d) Discrete Least Squares Error E(S_4) ===
0.566772
```