

1.

```
PS C:\Users\matth> & D:/python/python.exe c:/Users/matth/OneDrive/桌面/Numerical/HW4/HW4_1.py
a. Composite Trapezoidal Rule: 0.396148
b. Composite Simpson's Rule: 0.385664
c. Composite Midpoint Rule: 0.380805

True value (for reference): 0.385936
```

2.

```
PS C:\Users\matth> & D:/python/python.exe c:/Users/matth/OneDrive/桌面/Numerical/HW4/HW4_2.py
Gaussian Quadrature (n=3): 0.192259
Gaussian Quadrature (n=4): 0.192259
True value: 0.192259
Relative error (n=3, %): 0.000010%
Relative error (n=4, %): 0.000000%
```

3.

```
PS C:\Users\matth> & D:/python/python.exe c:/Users/matth/OneDrive/桌面/Numerical/HW4/HW4_3.py
a. Composite Simpson's Rule (n=4, m=4): 0.511988
b. Gaussian Quadrature (n=3, m=3): 0.511866
c. True value: 0.511845

Relative error (Simpson, %): 0.027920%
Relative error (Gaussian, %): 0.004084%
```

4.

```
PS C:\Users\matth> & D:/python/python.exe c:/Users/matth/OneDrive/桌面/Numerical/HW4/HW4_4.py
a. Integral (0 to 1)  $x^{-1/4} \sin x \, dx$ : 6.947084
b. Integral (1 to inf)  $x^{-4} \sin x \, dx$ : 0.274658
PS C:\Users\matth>
```