



Numerical Integration - Study Problems for FINAL

(Solve these using a calculator.)

1) Estimate the integral $\int_2^3 (1 + x^5) dx$ using the following methods:

- a) Simpson's method.
- b) Boole's method.
- c) Composite Simpson's method, $m = 2$.
- d) Composite Simpson's method, $m = 4$.
- e) Composite Boole's method, $m = 2$.

2) Estimate the integral $\int_1^2 \frac{\sin(4x)}{x} dx$ using the following methods:

- a) Simpson's method.
- b) Boole's method.
- c) Composite Simpson's method, $m = 2$.
- d) Composite Simpson's method, $m = 4$.
- e) Composite Simpson's method, $m = 5$.
- f) Composite Boole's method, $m = 2$.

3) Estimate the integral $\int_{-1}^1 \frac{1}{1+x^2} dx$ using the following methods:

- a) Composite Simpson's method, $m = 2$.
- b) Composite Boole's method, $m = 2$.
- c) Gaussian 2-point rule.
- d) Gaussian 3-point rule.

4) Estimate the integral $\int_{12}^{62} \arctan x dx$ using the following methods:

- a) Gaussian 2-point rule.
- b) Gaussian 3-point rule.
- c) Composite Gaussian 2-point rule, $m = 2$.
- d) Composite Gaussian 3-point rule, $m = 2$.

Answers

1)

- a) 111.9375
- b) 111.8333
- c) 111.8398
- d) 111.8337
- e) 111.8333

2)

- a) -0.167872
- b) -0.184502
- c) -0.183463
- d) -0.183986
- e) -0.184004
- f) -0.184021

3)

- a) 1.566667
- b) 1.571059
- c) 1.5
- d) 1.583333

4)

- a) 76.946690
- b) 76.906249
- c) 76.907450
- d) 76.899364