

1. Evaluate the following definite and indefinite integrals.

a. $\int_0^3 dx$

b. $\int (3 \csc \theta \cot \theta) d\theta$

c. $\int (x\sqrt{1-x}) dx$

d. $\int x(5-2x^2)^5 dx$

e. $\int \cos^2 3x dx$

f. $\int \left(\frac{4 + 5x^{3/2}}{\sqrt{x}} \right) dx$

g. $\int_3^5 \frac{5 + 6x + x^2}{5 + x} dx$

h. $\int_0^2 |x - 1| dx$

i. $\int_{\pi/4}^{\pi/3} \tan^3 x \sec^2 x dx$

2. Find the area of the region bounded by $y = (x - 1)^2 + 1$, the x -axis, $x = -1$ and $x = 2$.

3. Approximate the definite integral using the Trapezoidal Rule and Simpson's Rule with $n=4$.

Use $\frac{b-a}{2n}(f(x_0) + 2f(x_1) + 2f(x_2) + \dots + 2f(x_{n-1}) + f(x_n))$ for the Trapezoidal Rule

and use $\frac{b-a}{3n}(f(x_0) + 4f(x_1) + 2f(x_2) + \dots + 4f(x_{n-1}) + f(x_n))$ for Simpson's Rule

$$\int_0^1 \frac{1}{\sqrt{1+x^3}} dx$$

Trapezoidal Approximation:

Simpson's Rule Approximation:

