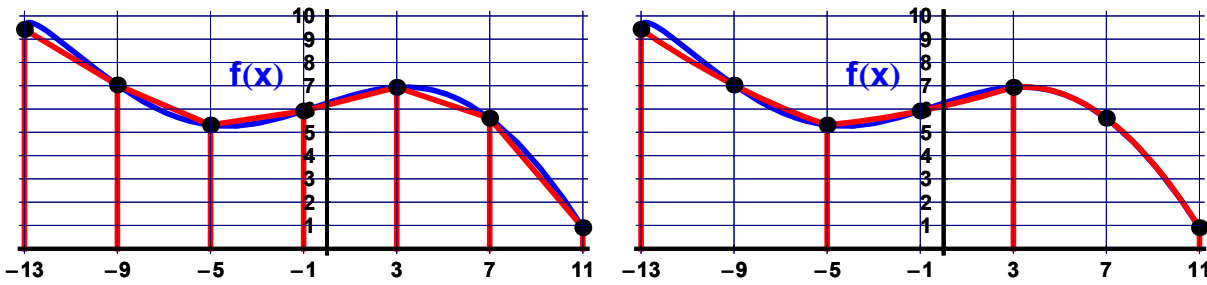


5.5 Trapezoidal Rule and Simpson's Rule

The Trapezoidal Rule uses trapezoids to approximate the area under the curve

$$\int_a^b f(x) dx \approx \frac{b-a}{2n} (f(x_0) + 2f(x_1) + 2f(x_2) + 2f(x_3) + \dots + 2f(x_{n-2}) + 2f(x_{n-1}) + f(x_n))$$

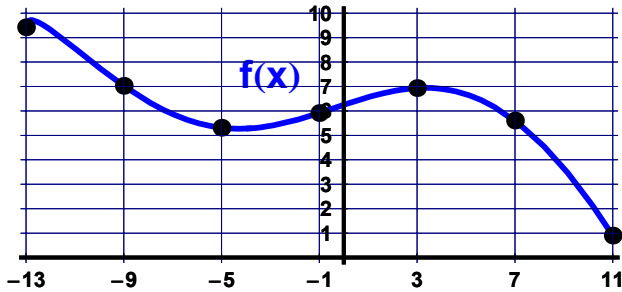


Simpson's Rule uses quadratics to approximate the area under the curve

$$\int_a^b f(x) dx \approx \frac{b-a}{3n} (f(x_0) + 4f(x_1) + 2f(x_2) + 4f(x_3) + \dots + 2f(x_{n-2}) + 4f(x_{n-1}) + f(x_n))$$

(n must be even for Simpson's Rule)

1. Approximate the area for the given curve using the Trapezoidal rule and Simpson's Rule with $n = 6$. Approximate each function value to the nearest whole number.



$$2. \int_0^2 x^3 dx \quad n = 6$$

$$3. \int_0^{\pi} \sqrt{\sin x} dx \quad n = 6$$

$$4. \int_0^6 2^{-x} dx \quad n = 6$$

$$5. \int_4^{12} \ln x dx \quad n = 4$$