

1: (a) Find $\int_{\sqrt{3}}^{\sqrt{8}} \frac{\sqrt{1+x^2}}{x} dx$.

(b) Find $\int_1^3 \frac{x^4 + 3x^3 + 6}{x^3 + 4x^2 + 3x} dx$.

2: (a) Find $\int_0^{\pi^2} \sin^2 \sqrt{x} dx$.

(b) Find $\int_1^2 \frac{x^3 + 2}{x^5 + 2x^3 + x} dx$.

3: (a) Approximate $\int_0^{10} \frac{10 dx}{x+2}$ using T_5 and find a bound on the error.

(b) Approximate $\int_1^3 \frac{dx}{x}$ using S_4 and find a bound on the error.

(c) Find a value of n such that if we approximate $\int_0^1 \frac{4 dx}{1+x^2}$ using M_n , the error is $E_n \leq \frac{1}{300}$.

4: (a) Find the improper integral $\int_1^{\infty} \frac{dx}{x^3 \sqrt{x^2 - 1}}$.

(b) Find the improper integral $\int_0^{\infty} \frac{e^x + 1}{e^{2x} + 1} dx$.

5: (a) Find the improper integral $\int_3^{\infty} \frac{dx}{(x^2 - 1)\sqrt{x}}$.

(b) Find the improper integral $\int_2^{17/4} \sqrt{\frac{x+2}{x-2}} dx$.