Smith & Minton, page 702, # 19. Use a known Taylor polynomial with \( n \) non-zero terms to estimate the value of the integral. \( \int_{-1}^{1} e^{-x^2} \, dx, \quad n = 5 \)

Smith & Minton, page 702, # 37. The power of a reflecting telescope is proportional to the surface area \( S \) of the parabolic reflector, where

\[
S = \frac{8\pi}{3} c^2 \left[ \left( \frac{d^2}{16c^2} + 1 \right)^{3/2} - 1 \right].
\]

Here, \( d \) is the diameter of the parabolic reflector, which has depth \( k \) with \( c = \frac{d^2}{4k} \). Expand the term

\[
\left( \frac{d^2}{16c^2} + 1 \right)^{3/2}
\]

and show that if \( \frac{d^2}{16c^2} \) is small, then \( S \approx \frac{\pi d^2}{4} \).
Topics for this week’s exam can be found in:

**Worksheets**
17: The Accumulation Function
18: Numerical Integration
19: Arc Length
20: Definition of the Integral
21: Fundamental Theorem of Calculus (3 parts)
22: Application of (Techniques of) Integration
23: Error Analysis of Numerical Integration
24: Periodic Functions
25: Periodic Motion of a Spring
26: Nonlinear Oscillations
27: Taylor Polynomials
28: Error in Taylor Polynomials
29: Application of Taylor Polynomials to IVPs and Integrals

**Quizzes**
7: Fundamental Theorem of Calculus
6: Numerical Integration
8: Integration Techniques
9: Taylor Polynomials

**Labs**
5: Simpson’s Rule
6: Techniques of Anti-differentiation
7: Investigating Trigonometric Functions
8: Investigating Taylor Polynomials

**Homework**
#12 to #19