Class 30: Wednesday November 12

Exam 2 Review and More Application of Taylor Polynomials

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

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 $c = \dfrac{d^2}{4k}$. Expand the term $\left(\dfrac{d^2}{16c^2}+1\right)^{3/2}$ and show that if $\dfrac{d^2}{16c^2}$ is small, then $S \approx \dfrac{\pi d^2}{4}$.

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