4-4 Videos Guide

4-4a

Exercises:

- Find the Taylor polynomial $T_3(x)$ for the function f centered at the number a. Graph f and T_3 on the same screen.
  - $f(x) = \sin x, \qquad a = \pi/6$
  - $f(x) = e^{-x}\sin x, \qquad a = 0$

4-4b

- Approximate f by a Taylor polynomial with degree n at the number a.
  (b) Use Taylor's Inequality to estimate the accuracy of the approximation $f(x) \approx T_n(x)$ when x lies in the given interval.
  (c) Check your result in part (b) by graphing $|R_n(x)|$.
  $f(x) = \sin x, \qquad a = \pi/6, \qquad n = 4, \qquad 0 \le x \le \pi/3$

4-4c

- Use the information from the previous exercise to estimate $\sin 38°$ correct to five decimal places.

4-4d

- Approximate f by a Taylor polynomial with degree n at the number a.
  (b) Use Taylor's Inequality to estimate the accuracy of the approximation $f(x) \approx T_n(x)$ when x lies in the given interval.
  (c) Check your result in part (b) by graphing $|R_n(x)|$.
  $f(x) = \ln(1 + 2x), \qquad a = 1, \qquad n = 3, \qquad 0.5 \le x \le 1.5$

4-4e

- Use the Alternating Series Estimation Theorem or Taylor's Inequality to estimate the range of values of x for which the given approximation is accurate to within the stated error. Check your answer graphically.
  $\cos x \approx x - \frac{x^2}{2} + \frac{x^4}{24} \qquad (|\text{error}| < 0.005)$