

Fall 2005 Math 151

Week in Review; R Oct 19

courtesy: Amy Austin

(covering sections 3.11 - 3.12, 4.1)

Section 3.11

- Given $y = 4 - x^2$
 - Find Δy if x changes from $x = 1$ to $x = 1.5$
 - Find dy for $x = 1$ and $dx = 0.5$.
 - Sketch a graph of $f(x)$ and label what Δy and dy represent.
- Use differentials to approximate :
 - $\sqrt[4]{1.02}$
 - $\cos 59^\circ$
- Find the linear approximation for $y = \frac{1}{x}$ at $x = \frac{1}{2}$
Sketch the graph of y as well as the linear approximation.
- Find the linear approximation for $y = \sqrt[3]{1+x}$ at $a = 0$ and use it to approximate $\sqrt[3]{.95}$ and $\sqrt[3]{1.1}$
- Find the quadratic approximation for $y = \frac{1}{x^2}$ at $a = 2$
- The radius of a circular disk is given as 24 cm with a maximum error in measurement of 0.2 cm. Use differentials to estimate the maximum error in the calculated area of the disk.

Section 3.12

- Given $f(x) = x^3 + x^2 + 2$, use Newtons Method with $x_1 = -2$ to find the third approximation to the root of the given equation.
- Use Newtons method to approximate $\sqrt[10]{100}$ to 6 decimal places. HINT: Define $f(x) = x^{10} - 100$ and use $x_1 = 1.5$.
- Use Newtons Method to approximate the root of $x^4 + x^3 - 22x^2 - 2x + 41 = 0$ in the interval $[1, 2]$ to 6 decimal places.

Section 4.1

- Sketch the graph of $f(x) = 3^x$ and $f(x) = 5^x$ on the same axis. Be sure to label each graph.
- Compute $\lim_{x \rightarrow \infty} \frac{2^{-x} + 2^x}{4^{-x} + 3^x}$
- If $y = x^r e^{sx}$, and r and s are constants, find y' .
- Given $f(x) = \frac{e^x - e^{\frac{x}{2}}}{2}$, find $f''(0)$
- Find the derivative:
 - $f(x) = \sqrt{4 - e^{-2x}}$
 - $f(x) = \tan^3(e^{-x})$