

## Math 3A REVIEW

### Ch 2 Limits

- be able to evaluate limits; do continuity problems (2.4); infinite limits (asymptotes);  $\epsilon - \delta$  definition of limits
- (section 4.5 also has to do with limits, which helps us find horizontal or slant asymptotes)
- removeable/nonremoveable discontinuities

### Ch 3 Differentiation

- Rules: sum, difference, product, quotient and chain rule (p.160) (These are **essential** for you to know and understand!)
- Implicit differentiation (p.167) Useful when you want to find  $\frac{dy}{dx}$ , but you can't solve for y.
- Basic Differentiation Rules for Elementary Functions (p.179), including derivatives of inverse trig functions
- Log Differentiation (3.5)
- Related rates (p.183) (here we differentiate everything with respect to time, t)

### Ch 4 Applications of Differentiation

- Extrema on an interval (p.207)--occur at the endpoints of the interval or at the critical numbers; a critical number must be a value for which f is defined- check the definition (p. 206)
- Mean-Value Theorem: f is cont on [a,b] and differentiable on (a, b), then there exists a c in [a,b] such that  $f'(c) = \frac{f(b) - f(a)}{b - a}$  also Rolle's Theorem
- Sketching:
  - increasing and decreasing, use 1st Derivative Test (p. 221)
  - concavity and 2nd Der Test (p. 231, 234)
  - pts of inflection (p. 233)
  - limits- to find asymptotes (4.5)
  - suggestions for sketching (p.249)
- Optimization problems (maximize/minimize)
- Differentials;  $dy = f'(x) dx$

### Ch 5 Integration

- list of formulas (p. 286)
- Indefinite integrals
- Riemann sums
- Area and the definite integral (Theorem p. 310)
- Fundamental Theorem : f is cont on [a, b], then  $\int_a^b f(x)dx = F(b) - F(a)$   
where  $F'(x) = f(x)$

- Ch 5 continued:

    Mean Value Theorem for Integrals and the Average Value of a Function  
    (know how to find the average value of a function)

- Second Fundamental theorem (p.325) (be able to use)

- u substitution (very important!!)

- Log Rule for integration  $\int \frac{1}{u} du = \ln|u| + C$

- Guidelines for integration (p.355)

- 6 More Formulas (p.357)