

# BC CALCULUS MIDTERM EXAM REVIEW TOPICS '18-'19

## Limits and Continuity – Chapter 1

- Graphical Representations of Limits
  - 1 sided limits
  - 2 sided limits
  - Limits approaching infinity

- Computational Techniques of Limits

### The Basics

- Sums and differences
- Products and Quotients
- Roots
- Constants
- Forms of  $\frac{1}{x}$
- nth roots

### Polynomials

- As  $x \rightarrow a$
- As  $x \rightarrow \pm\infty$

- Continuity/Differentiability
- Point Continuity Definition
- $\lim_{x \rightarrow c} f(x) = f(c)$
- Cusp and vertical tangency

## Derivatives – Chapter 2 and Chapter 3

- Applications of the derivative
  - Slope of a secant line
    - Average rates of change
    - Average velocities
  - Slope of a tangent line
    - Instantaneous rates of change
    - Instantaneous velocities
  - Find equations of tangent lines
  - Linear Approximation
  - Related Rates
- Derivative Rules
  - Constants
  - Power Rule
  - Constant times a function
  - Sums and Differences
  - Product Rule
  - Quotient Rule

### Rational Functions

#### L'Hopital's Rule

As  $x \rightarrow a$  resulting in a quotient  $\frac{0}{0}, \frac{0}{\text{constant}}, \frac{\text{constant}}{0}$

As  $x \rightarrow \pm\infty$

### Radicals

Continuous functions and absolute value

### Piecewise Functions

- Derivative Rules cont.,
  - Reciprocal Rule
  - Higher Derivatives
  - Trig Functions
  - Log/Ln
  - Exponential
  - Inverse Trig
  - L'Hopital's Rule of all forms
- Derivatives from a limit (2 forms)
- Chain Rule
  - Function notation
  - Reading a table/graphs
  - Double chain rule
- Implicit Differentiation
- Logarithmic Differentiation
- Derivatives of inverses of  $f(x)$

## Graphing – Chapter 4

- Critical points, Stationary points, Intervals of Increase and Decrease, Concavity, Inflection Points, cusp and points of vertical tangency
- First and second derivative tests
- Absolute/Relative Maximum and Minimum
- Optimization
- Particle Movement
- Rolle's Theorem and Mean Value Theorem