Calculus I Refresher Course Content

NOTES: This refresher course includes trigonometry review, since this will be needed in Calculus II. Students should be familiar with the derivatives and integrals of basic the trigonometric functions before beginning Calculus II, where more complicated trigonometric integrals will be introduced. Hyperbolic functions (e.g. ,), are not covered here, but their derivatives and integrals can be found in any calculus text or table of derivatives/integrals.

Also included here are *partial fractions* (section 8.3) and introduction to *parametric equations* (section 10.5), since these skills will be relevant in Calculus II. If you find them to be totally unfamiliar (many Precalculus and Calculus I courses don't cover them), you should be able to learn them in Calculus II, as most instructors will cover them in their lectures. However, you may benefit from seeing these topics ahead of time.

Some schools include *volumes of solids of rotation* (an application of integrals) in their Calculus I curriculum. At Imperial Valley College, this is introduced in the Calculus II curriculum, and is therefore not covered for review here.

Finally, *integration by parts* is a Calculus II topic, and therefore should not be included in the review exercises here. If you encounter any integrals in these exercises requiring integration by parts (potentially in section 22.3), you may safely ignore them.

A symbol indicates that an animation is available for one or more exercises in this section.
A symbol indicates that a video is available for one or more exercises in this section.

- 7. Additional Topics in Trigonometry
  - Section 7.1: The Law of Sines
  - Section 7.2: The Law of Cosines
  - Section 7.3: Polar Coordinates
  - Section 7.4: Graphs of Polar Equations
  - Section 7.5: Complex Numbers in Polar Form; DeMoivre's Theorem
  - Section 7.6: Vectors
  - Section 7.7: The Dot Product
- 8. Systems of Equations and Inequalities (partially included)
  - Section 8.1: Systems of Linear Equations in Two Variables
  - Section 8.2: Systems of Linear Equations in Three Variables
  - Section 8.3: Partial Fractions
  - Section 8.4: Systems of Nonlinear Equations in Two Variables
  - Section 8.5: Systems of Inequalities
  - Section 8.6: Linear Programming
- 9. Matrices and Determinants
- 10. Conic Sections and Analytic Geometry (partially included)
  - Section 10.1: The Ellipse
  - Section 10.2: The Hyperbola
  - Section 10.3: The Parabola
  - Section 10.4: Rotation of Axes
  - Section 10.5: Parametric Equations
  - Section 10.6: Conic Sections in Polar Coordinates
- 12. Limits and the Derivative
  - Section 12.1: Limits
  - Section 12.2: Continuity
  - Section 12.3: Rates of Change
  - Section 12.4: Definition of the Derivative
  - Section 12.5: Graphical Differentiation
- 13. Calculating the Derivative
  - Section 13.1: Techniques for Finding Derivatives
  - Section 13.2: Derivatives of Products and Quotients
  - Section 13.3: The Chain Rule
  - Section 13.4: Derivatives of Exponential Functions
  - Section 13.5: Derivatives of Logarithmic Functions

- 14. Graphs and the Derivative
  - Section 14.1: Increasing and Decreasing Functions
  - Section 14.2: Relative Extrema
  - Section 14.3: Higher Derivatives, Concavity, and the Second Derivative Test
  - Section 14.4: Curve Sketching
- 15. Applications of the Derivative
  - Section 15.1: Absolute Extrema
  - Section 15.2: Applications of Extrema
  - Section 15.3: Further Business Applications
  - Section 15.4: Implicit Differentiation
  - Section 15.5: Related Rates
  - Section 15.6: Differentials: Linear Approximation
- 16. Integration
  - Section 16.1: Antiderivatives
  - Section 16.2: Substitution
  - Section 16.3: Area and the Definite Integral
  - Section 16.4: The Fundamental Theorem of Calculus
  - Section 16.5: The Area Between Two Curves
  - Section 16.6: Numerical Integration
- 17. Further Techniques and Applications of Integration
- 18. Multivariable Calculus
- 19. Differential Equations
- 20. Probability and Calculus
- 21. Sequences and Series
- 22. Trigonometric Functions and Calculus
  - Section 22.1: Definitions of the Trigonometric Functions
  - Section 22.2: Derivatives of Trigonometric Functions
  - Section 22.3: Integrals of Trigonometric Functions