KNEWTON | alta

Single Variable Calculus, Early Transcendentals

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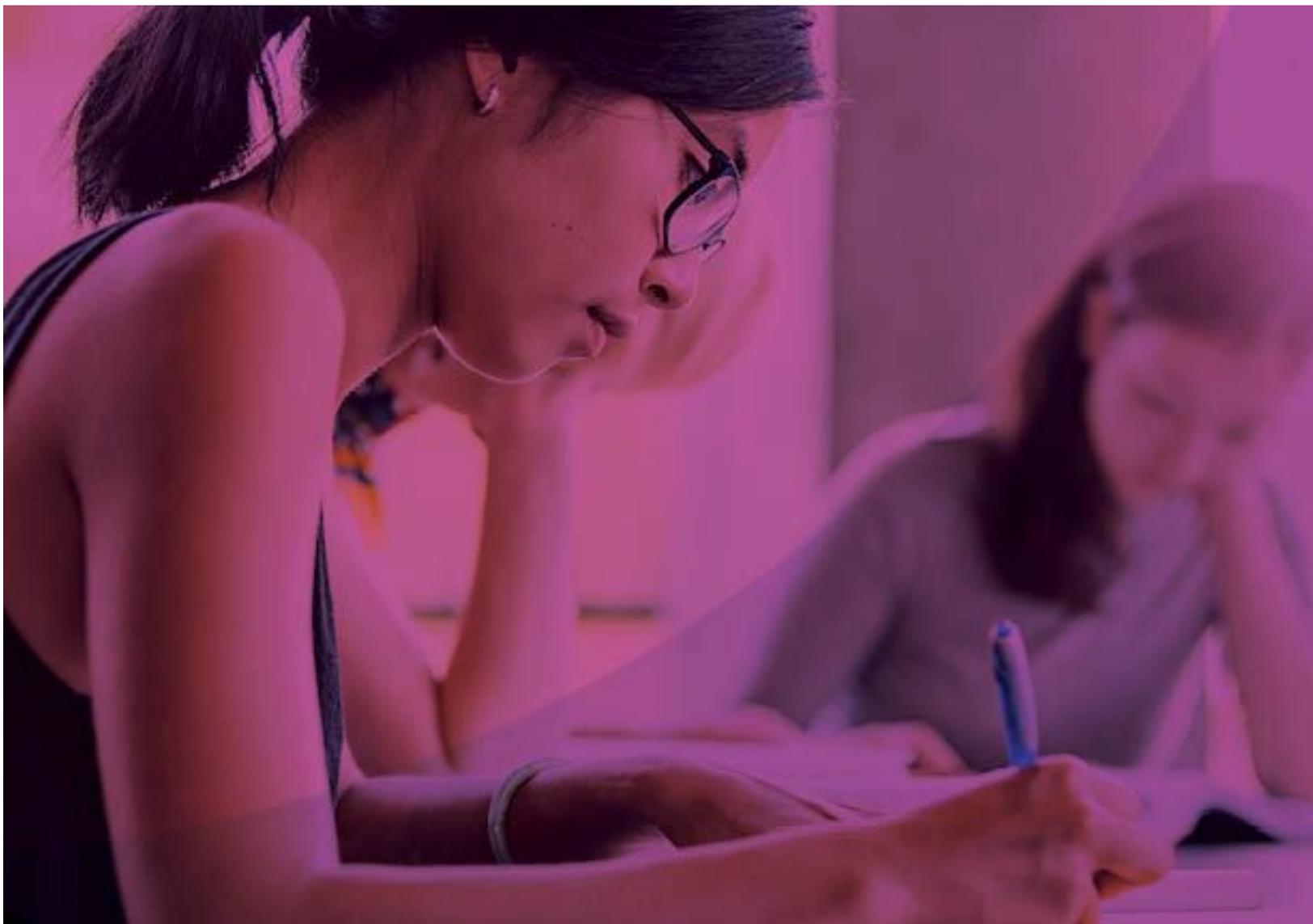
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OpenStax	Gilbert Strang, Massachusetts Institute of Technology Edwin "Jed" Herman, University of Wisconsin-Stevens Point	Calculus Volume 1 Calculus Volume 2	OpenStax
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Alta Single Variable Calculus was developed to meet the scope and sequence of a typical two semester calculus course. To develop the course, Knewton used three main sources of content: Openstax, videos created by a Math Professor we have partnered with, and a team of Subject Matter Experts. The SMEs come from diverse backgrounds and are all academics in the field of Mathematics.

Alta Single Variable Calculus has two instructional sequences for every learning objective, giving students multiple opportunities to learn new concepts. Between our OpenStax text content, instructional videos, and Knewton SMEs, we were able to solicit ideas from math instructors and students. Alta Single Variable Calculus covers the typical breadth of calculus topics and also provides the necessary depth to ensure the course is manageable and engaging for instructors and students alike.

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  - ● Determine the error of a estimated function value using Taylor's theorem
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  - ● Estimate a trigonometric function value using Maclaurin polynomials
- ● Representing Functions with Taylor and Maclaurin Series
  - ● Represent a function at a value with a Taylor series and determine the interval of convergence
  - ● Find the Maclaurin series for a function and show that the series converges
10.4 Working with Taylor Series

- Binomial Series
  - Find the binomial series for function
  - Estimate a function value using a binomial series
- Finding the Maclaurin Series that Represents a Function
  - Find the Maclaurin series for a trigonometric function
  - Find the Maclaurin series for a logarithmic or exponential function
  - Find a Maclaurin series by differentiating another series
- Applications of the Taylor and Maclaurin Series
  - Evaluate a nonelementary definite integral using a Taylor series
  - Approximate a probability using a Maclaurin series
  - Approximate the period of a pendulum using a binomial series

Chapter 11: Parametric Equations and Polar Coordinates
11.1 Parametric Equations
- Write Parametric Equations
  - Parameterize a curve
  - Find the parametric equations for a line segment given an orientation
- Eliminate the Parameter
  - Eliminate the parameter in linear equations
  - Eliminate the parameter in polynomial and radical equations
  - Eliminate the parameter in exponential and logarithmic equations
  - Eliminate the parameter in trigonometric parametric equations
- Graph Parametric Equations
  - Graph parametric equations by plotting points
  - Graph trigonometric parametric equations by plotting points
  - Use parametric equations in applications
- Cycloids
  - Graph a cycloid defined by parametric equations
  - Determine the number of cusps on a hypocycloid

11.2 Calculus of Parametric Curves
- Derivatives of Parametric Equations
  - Find the derivative of a curve defined by polynomial parametric equations
  - Find the derivative of a curve defined by trigonometric parametric equations
  - Find the equation of a line tangent to a parametrically defined curve
  - Find the second derivative of curve defined by parametric equations
- Integrating Parametric Curves
  - Find the area under a curve defined by parametric equations
  - Find the arc length of a curve defined by trigonometric parametric equations
  - Find the surface area of a volume of revolution generated by revolving a parametrically defined curve
11.3 Polar Coordinates
- Defining Polar Coordinates
  - Locate points in a plane by using polar coordinates

- Convert coordinates from polar form to rectangular form
- Convert coordinates from rectangular form to polar form
- Converting Equations Between Rectangular and Polar Forms
  - Convert a cartesian equation to polar form
  - Convert a polar equation to cartesian form
- Graphs Using Polar Coordinates
  - Identify symmetry in polar equations and curves
  - Graph polar equations by plotting points and find zeros and maximum values for a polar equation

11.4 Calculus in Polar Coordinates
- Area and Arc Length in Polar Coordinates
  - Find the area of a region between two polar curves
  - Find the arc length of a polar curve
  - Find the area of a region bounded by a polar curve