Calculus Screencast Videos from Grand Valley State University

http://gvsu.edu/s/pG (click on link on our Moodle page – used with permission)

The number and "Screencast" refers to the listing on the GVSU YouTube site. The Section number in brackets refers to the corresponding section in our textbook.

1 Screencast 1.1.1: Using the average velocity formula [Section 2.1]
This screencast introduces the idea of average velocity and a formula for finding average velocity, followed by three brief examples.

2 Screencast 1.1.2: Alternative Average Velocity Formula [Section 2.2]
We present a second formula for average velocity that uses a starting time and a change in elapsed time. Two examples show how the formula is used for a specified start time and change amount, and for a specified start time and variable change amount.

3 Screencast 1.1.3: FInding Instantaneous Velocity [Section 2.2]
We introduce the concept of instantaneous velocity and give an extended example of calculating instantaneous velocity using a sequence of average velocities.

8 Screencast 1.3.1: Quick review - The derivative of a function at a point [Section 2.2]
This video reviews the main concepts about the derivative of a function at a point.

9 Screencast 1.3.2: The derivative of a function at a point [Section 2.2]
This video gives an example of using the definition of the derivative to calculate the derivative of a function at a single point.

10 Screencast 1.3.3: Derivative of a function at a point using graphs [Section 2.2]
This video shows how to estimate the derivative of a function at a point using a graph, by tracing a tangent line to the graph and estimating slope.

11 Screencast 1.4.1: Quick review - The Derivative Function [Section 2.3]
A quick recap of the main ideas on "The Derivative Function".

12 Screencast 1.4.2: Limit definition of derivative [Section 2.3]
This screencast shows how to take the derivative of a third degree polynomial using the limit definition.

13 Screencast 1.4.3: Sketching a derivative graph [Section 2.3]
This screencast shows how to graph the derivative from the graph of a function.

15 Screencast 1.5.2: Estimating the Derivative [Section 2.3]
This screencast shows how to estimate the derivative given a table of values with the forwards, backwards and central differences.

17 Screencast 1.6.1: Quick review - The second derivative [Section 2.5]
Recap of the concept of the second derivative and concavity.

19 Screencast 1.6.3: Determining concavity from a graph [Section 2.5]
Two examples on determining where a function is concave up and concave down based on its graph.

20 Screencast 1.7.1: Quick review - Limits, continuity, and differentiability [Section 2.6]
Review of three related concepts: Limits (specifically the left- and right-handed limit), continuity of a function, and differentiability of a function.

23 Screencast 1.7.4: Determining differentiability graphically [Section 2.6]
Discusses how to tell where a function is differentiable by examining its graph.

24 Screencast 1.8.1: Quick review - The tangent line approximation [Section 2.2, 2.4]
Recap of the major ideas on the tangent line approximation and local linearization.

25 Screencast 1.8.2: Calculating a tangent line [Section 2.2]
Shows how to find the equation of a tangent line to a function at a given point.

26 Screencast 1.8.3: Using a tangent line [Section 2.2, 2.4]
Describes how to use a tangent line to estimate the value of a function.

27 Screencast 1.8.4: Using the local linearization [Section 2.2, 2.4]
Example of calculating and using the local linearization of a function -- this time given as a table of data -- at a point to approximate an unknown data point.

28 Screencast 2.1.1: Quick review - Elementary derivative rules [Chapter 3]
Quick recap of the fundamental derivative rules regarding constant, power, and exponential functions as well as the Constant Multiple Rule and the Sum Rule.

29 Screencast 2.1.2: Derivatives of power and constant functions [Section 3.1]
Describes how to take the derivative of power and constant functions.

30 Screencast 2.1.3: Derivatives of Exponential Functions [Section 3.2]
Describes how to take the derivative of an exponential function.

31 Screencast 2.1.4: Derivatives of constant multiples [Section 3.1]
Describes how to take the derivative when the function is multiplied by a constant.

32 Screencast 2.1.5: Derivatives of sums [Section 3.1]
Shows how to take the derivative of functions involving sums.

33 Screencast 2.3.1: Quick review - The Product and Quotient Rules [Section 3.3]
A quick overview of the statements of the Product and Quotient Rules.

34 Screencast 2.3.2: Product Rule examples [Section 3.3]
Two quick examples of the Product Rule in action, and one example where you should NOT use the Product Rule.

35 Screencast 2.3.3: Quotient Rule Examples [Section 3.3]
Shows how to use the quotient rule when taking the derivative of a quotient.

36 Screencast 2.3.4: Combining the Product and Quotient Rules [Section 3.3]
Long-ish example in which the Product Rule and Quotient Rule are both used, but which one should go first?

39 Screencast 2.5.1: Quick review - The Chain Rule [Section 3.4]
Brief review of composite functions and the Chain Rule.

40 Screencast 2.5.2: Example of the Chain Rule - Polynomials [Section 3.4]
Shows how to use the chain rule with a composite of polynomial functions.

41 Screencast 2.5.3: Example of the Chain Rule - Radicals [Section 3.4]
An example of the use of the Chain Rule involving a square root function.

44 Screencase 2.5.4: Chain Rule Examples - Trigonometric functions [Section 3.4, 3.5]
Shows how to do the derivative of composite functions featuring trig functions.

43 Screencast 2.5.5: Chain Rule Examples - Exponential Functions [Section 3.4]
Two examples of the Chain Rule involving exponential functions.

44 Screencast 2.5.6: Chain Rule Examples - Mixing rules [Section 3.4]
Two examples of the Chain Rule where other rules (or repeated uses of the Chain Rule) are involved.

45 Screencast 2.5.7: Chain Rule example - graphs only [Section 3.4]
An example of using the Chain Rule when the functions involved are given by graphs, not formulas.