

Calculus Learning Targets (LT)

Chapter 2: Limits and Continuity

LT 2.1 – Define a limit and evaluate limits.

Skills Assessed:

- 1) Evaluate limits (one sided and two sided)
 - Graphically
 - By substitution
 - With tables
 - Using properties of limits
- 2) Know when limits do not exist (DNE)

LT 2.2 – Evaluate limits as $x \rightarrow \pm\infty$ and infinite limits as $x \rightarrow a$

Skills Assessed:

- 1) Evaluate limits by looking at end behavior
- 2) Finding what x approaches at an asymptote

LT 2.3 – Determine whether a function is continuous. If not, find where the function is discontinuous.

Skills Assessed:

- 1) Determine whether a function is continuous.
- 2) Finding where a function is discontinuous and determine the type of discontinuity.

LT 2.4 – Find Slopes of tangent lines to a curve.

Skills Assessed:

- 1) Finding equation of tangent lines.
- 2) Find instantaneous rate of change.

Chapter 3: Derivatives

LT 3.1 –Apply definition of derivative.

Skills Assessed:

- 1) Use the definition of a derivative to find derivatives of functions.
- 2) Graph a function and its derivative.

LT 3.2 – Determine whether a function is differentiable.

Skills Assessed:

- 1) Determine whether a function is differentiable from its graph.
- 2) Use numerical differentiation to determine if a function is differentiable at a point.

LT 3.3 – Use the rules of differentiation to evaluate derivatives.

Skills Assessed:

- 1) Use the power, product, and quotient rule to evaluate derivatives of functions (including trigonometric functions, *Section 3.5*)

LT 3.4 – Find the relationship between displacement, velocity, speed, and acceleration of a motion function.

Skills Assessed:

- 1) Answer questions about velocity graphs.
- 2) Find equations for velocity, speed, and acceleration of a particle in motion.
- 3) Find marginal cost and revenue

Chapter 4: More Derivatives

LT 4.1 – Evaluate the derivative of a function using the chain rule.

Skills Assessed:

- 1) Use the chain rule to evaluate derivatives of composite functions, trig functions, and parametric functions.

LT 4.2 – Evaluate derivatives using implicit differentiation.

Skills Assessed:

- 1) Find derivatives using implicit differentiation.
- 2) Use implicit differentiation to find equations for tangent lines.

LT 4.3 – Find the derivative of inverse trigonometric functions.

Skills Assessed:

- 1) Find derivatives of inverse trigonometric functions.
- 2) Find equation of tangent lines of inverse trigonometric functions.

LT 4.4 – Find the derivative of exponential and logarithmic functions.

Skills Assessed:

- 1) Find the derivative of exponential and logarithmic functions.
- 2) Determine the domain of the derivative of exponential and logarithmic functions.
- 3) Use logarithmic differentiation to find the derivative of a function. *Add for 2015-16

Chapter 5: Applications of Derivatives

LT 5.1 – Find the extreme values of functions.

Skills Assessed:

- 1) Determine whether a value is an absolute or relative extreme.
- 2) Find critical points and stationary points analytically and graphically.

LT 5.2 – Use the Mean-Value Theorem (MVT) to determine where a graph rises and falls.

Skills Assessed:

- 1) Determine whether a function satisfies the hypothesis of the MVT.
- 2) Apply the MVT to show where a function increases or decreases.

LT 5.3 – Determine critical points, where a function is increase or decreasing, points of inflection, and concavity of a function by the graph of the function, derivative of the function, or 2nd derivative of the functions.

Skills Assessed:

- 1) Find local extremes using the 1st Derivative Test or 2nd Derivative Test.
- 2) Determine concavity of a function.
- 3) Sketch graphs of functions from the graph of first and second derivative.

LT 5.4 - Apply absolute maximum/minimum problems to real world situation.

Skills Assessed:

- 1) Find optimal area or volume of a figure.
- 2) Find maximum profit.

LT 5.5 – Use linearization and differentials to approximate values.

Skills Assessed:

- 1) Use linearization to estimate the value of a function at a given point or use linearization to approximate roots.

- 2) Find differentials and use differentials to estimate.

LT 5.6 – Solve real world problems using related rates.

Skills Assessed:

- 1) Solve real world problems using related rates.

Chapter 6: The Definite Integral

LT 6.1 – Use finite sums to approximate values.

Skills Assessed:

- 1) Use the three rectangular approximation methods (left, right, and midpoint) to approximate values of area under a curve, volume of a solid, distance, or other situations.

LT 6.2 – Evaluate definite integrals geometrically.

Skills Assessed (Section 6.2):

- 1) Model situations on graphs with a Riemann sum.
- 2) Calculate area under a curve with a definite integral

LT 6.3 – Evaluate definite integrals analytically.

Skills Assessed (Section 6.3):

- 1) Evaluate derivatives using the Rules of Integration
- 2) Calculate average value of a function on a given interval.

LT 6.4 – Use the Fundamental Theorem of Calculus.

Skills Assessed:

- 1) Find antiderivatives using the Fundamental Theorem of Calculus, Part 1.
- 2) Find area using the Fundamental Theorem of Calculus, Part 2.

LT 6.5 – Approximate integrals

Skills Assessed:

- 1) Approximate integrals using the trapezoidal rule.
- 2) Approximate integrals using Simpson's Rule.

Chapter 7: Differential Equations and Mathematical Modeling

LT 7.1 – Solve and graph differentiable equations.

Skills Assessed:

- 1) Use differential equations to find initial values.
- 2) Construct slope fields from a differential equation.
- 3) Write a differential equation from a slope field.

LT 7.2 – Find antiderivatives by substitution.

Skills Assessed:

- 1) Apply integration techniques to functions that require substitution. Functions include: power, trigonometric, exponential, and logarithmic functions.

LT 7.3 – Use differential equations to solve problems involving exponential growth/decay.

Skills Assessed:

- 1) Solve a differential equation by separation.
- 2) Use Newton's Law of Cooling.

Chapter 8: Applications of Definite Integrals

LT 8.1 – Integral as Net Change

Skills Assessed:

- 1) Use integrals to find displacement, distance, or velocity of a particle.
- 2) Use integrals to find consumption over time.
- 3) Use integrals to find net change from data.
- 4) Use integrals to find amount of Work done.

*Not all of these will be on assessment but all are fair game.

LT 8.2 – Areas in the Plane

Skills Assessed:

- 1) Find the area between two curves on a plane.
- 2) Find the area between two curves by integrating with respect to the y-axis.

LT 8.3 – Volumes

Skills Assessed:

- 1) Find volume of a solid by the disk method.
- 2) Find volume of a solid by using the washer method.
- 3) Find volume of a solid by using different shaped cross sections.

THE FINE PRINT!!!

**The teacher reserves the right to modify, add, or subtract the Learning Targets covered in any test. Any modifications will be done prior to a chapter test with enough time for the student to make any necessary adjustments.*