Learning Outcomes for Exams

There are 16 Learning Targets* (listed below) that are aligned with Exams 1-3 and Final Opportunity. These are the main tasks that you should be able to do if you are successful in MATH 1100. Six of these are designated as **Core** learning targets because they are the most essential topics in the class. Your main goal in the course is to provide evidence of skill on as many targets as possible.

1. **(CORE):** I can find one- and two-sided limits of a function at a point and at infinity (using numerical, graphical, and algebraic methods) and determine continuity of a function.

2. I can find the derivative of a function (both at a point and as a function) and the instantaneous rate if change using the definition of the derivative.

3. (**CORE**): I can use derivative notation correctly, state the units of a derivative, estimate the value of a derivative using difference quotients, and correctly interpret the meaning of a derivative in context.

4. Given information about f, f', or f'', I can correctly give information about f, f', or f'', and the increasing/decreasing behavior and concavity of f (and vice versa).

5. (**CORE**) I can compute basic-level derivatives using algebraic shortcut methods and solve simple application problems. (Functions involved will include constant, power, polynomial, and exponential functions; applications include rates of change and slopes/equations of tangent lines)

6. (**CORE**) I can compute derivatives involving the Product, Quotient, and Chain Rules. (Functions involved will be those under "basic").

7a. I can compute advanced-level derivatives using algebraic shortcut methods. (Functions involved will include "basic" ones along with Product, Quotient, and Chain Rules and multiple rules in combination.)

7b. I can compute advanced-level derivatives using **implicit differentiation** technique and algebraic shortcut methods. (Functions involved will include "basic" ones along with Product, Quotient, and Chain Rules and multiple rules in combination.)

7c. I can compute advanced-level derivatives in **related-rates applications** using implicit differentiation technique and algebraic shortcut methods. (Functions involved will include "basic" ones along with Product, Quotient, and Chain Rules and multiple rules in combination.)

7d. I can compute advanced-level derivatives using algebraic shortcut methods. (Functions involved will include "basic" ones plus either **natural exponential functions** or **natural logarithmic**

functions along with Product, Quotient, and Chain Rules and multiple rules in combination.)

8. I can find the critical values of a function, determine where the function is increasing and decreasing, and apply the First and/or Second Derivative Tests to classify the critical points as local extrema.

9. I can determine the intervals of concavity of a function and find all of its points of inflection.

10. (**CORE**) I can set up and use derivatives to solve applied optimization problems.

11. I can find antiderivatives of a function using the basic rules of integrals.

12. I can find antiderivatives of a function using the basic technique of integration by substitution.

13. I can find antiderivatives of a function and evaluate a definite integral using the Fundamental Theorem of Calculus and the Properties of the Definite Integral.

14. I can calculate the area under a curve, net change, and displacement using the definite integral.

15.(**CORE**) I can use the definite integral to solve a real-world problem.

16. I can determine and interpret partial derivatives of a function of two variables in different applications.