Exam 2 (over Sections 2.4-2.6, Chapter 3, and Section 4.1) will be available in the Math Test Center, KT G18.

Walk in with any kind of Photo ID and a grapher the following dates and times.

Monday, March 2: after class - 3:30 p.m.
Tuesday, March 3: 9:00 a.m. - 3:30 p.m.
Wednesday, March 4: 9:00 a.m. – 7:00 p.m.
Thursday, March 5: 9:00 a.m. – 7:00 p.m.
Friday, March 6: 9:00 a.m. - 3:30 p.m.

There is no class meeting **Friday, March 6**. No appointment is necessary. You can only take the test in one sitting. You will have unlimited time to take it, constrained only by the hours of the test center. If you want more than one hour to complete the test (recommended), arrive earlier, because the ending times listed above only provide one hour to complete the test. You may not bring any notes nor a formula sheet.

To prepare: Review your past quizzes and in-class activities. A compilation of past homework questions is available for practice on MML called *Practice Questions for Exam 2).* Problem numbers below reference this set of practice questions. Working this set of practice questions is entirely optional; however highly recommended. No grade will be recorded whether you do it or not, even though MML will insist on reporting a score for you, which you can just ignore, **unless** you are interested in a test retake opportunity as noted next to the rhino below.

Perk: If you have earned a 90% or higher on the MML Homework Assignments for this test and earned a score of 100% on *Practice Questions for Exam 2* by **11:59 PM Tuesday, March 17** you are permitted to ask me for a test ticket to retake another version of this exam. The retake must occur on or before **Thursday, March 19.** Remember you can redo past due MML HW for a 10% penalty, so this option is open for anyone willing to put in a rhino's effort.

1. If given an exponential formula, report the growth factor and percent growth rate (or decay factor and percent decay rate). Know their general shape. #1
2. Write formulas of exponential formulas if given the percent growth rate. #4
3. Solve an exponential equation with logarithms. #2
4. Use a logistic equation to model cumulative total sales. #5
5. Report the effective rate of an account. #3, 4
6. Compare two companies whose sales are growing exponentially using the effective rate. #4
7. Use the numeric representation of a function to determine if it is linear and, if so, find a formula. #8
8. Find and interpret the meaning of the average rate of change as the slope of the secant line. Exploit a grid if available. #6, 7, 12
9. Find and interpret the instantaneous rate of change of a function at a point $x = a$ by finding the slope of the tangent line. Exploit a grid if available, or make use of the Draw > Tangent command on a grapher, or simply find the derivative at $x = a$. #9-12, 22, 24
10. Find the instantaneous rate of change using a grapher. #12
11. Find a limit as x approaches a value from the left or the right.
    a. Use the definition of the limit (left hand limit = right hand limit) to determine if a limit of a function exists at a point. #13-19
    b. Evaluate one-sided and two-sided limits from graphs. #14-19
    c. Given a function $h(x)$ with a hole at (a, b), write the formula in the form $h(x) = f(x) \cdot \frac{(x-a)}{(x-a)}$ to find $\lim_{x \to a} h(x)$, utilizing the joyous fact that $\lim_{x \to a} h(x) = \lim_{x \to a} f(x) \cdot \frac{(x-a)}{(x-a)} = b$ and acquiring the y-coordinate of the hole b by finding $b = f(a)$. #18
    d. Find the limit at infinity (as $x \to \infty$ or as $x \to -\infty$) of a function $f(x)$, especially when $f(x)$ has a horizontal asymptote. #20, 48
12. Given a graph, determine values of x where a function is not differentiable (a cusp or a vertical tangent). #24, 25, 46
13. Given a graph, determine values of x where a function is not continuous. #17
14. Use a graph of a function to find information about its derivative. Given the graph of $f(x)$, use the slope of the curve at $x = a$ or at $x = b$ to compare the values of $f'(a)$ and $f'(b)$. #9-11, 22, 32, 42-43, 45-48
15. Given the graph of $f(x)$, be able to sketch the graph of the derivative $f'(x)$, making sure your sketch is consistent with the important features of the graph of the original function. Determine from the graph of $f(x)$ where its derivative $f'(x)$ is zero, positive, negative, or undefined. #25-32
16. Find and interpret the derivative $f'(x)$ at a value $x = a$. In real world applications, be able to report the measurement of unit of $f(a)$ and $f'(a)$. If given the distance, $s(t)$, find the velocity $s'(t)$. #25, 35, 44,
17. Find the derivative of a constant function $y = f(x) = c$. #22
18. Find the derivative of a linear function $y = f(x) = mx + b$. #22, 41
19. Find derivatives of polynomials using the constant multiple rule, sum rule, and power rule. Interpret. #22, 26, 27, 28, 29, 31, 33- 41,
20. Use the power rule to find the derivative of a function containing negative and/or fractional powers. #46, 47, 48
21. Model real-world situations and use the marginal cost, revenue, or profit to analyze and make decisions and find break-even points. #40-45