MATH 2554 Quiz 11 (Sections 4.6 & 4.7)
Due Tuesday April 14

This quiz is due on Tuesday, April 14 at the beginning of your drill. As was the case with other quizzes, standard rules apply. **Your solutions must be legible, in order, stapled, de-fringed, and with your name on the top right corner of each page.** Each question is worth one point.

1. List the 3 hypotheses that must be met in order to apply Rolle's Theorem to a function *f(x)*. List the 2 hypotheses that must be met in order to apply the Mean Value Theorem to a function *g(x)*.

2. Determine if Rolle's Theorem can be applied to the function $f(x) = 4x^4 + 8x^3 - 60x^2$ on the interval [-5, 3]. If not, state why not. If so, determine the point(s) that are guaranteed to exist by Rolle's Theorem.

3. Determine if the Mean Value Theorem can be applied to the function $g(x) = x^2 + \dfrac{1}{(x-2)^2}$ on the interval [1, 5]. If not, state why not. If so, determine the point(s) that are guaranteed to exist by the Mean Value Theorem.

4. Determine if the Mean Value Theorem can be applied to the function $h(x) = x + 2 + \dfrac{3}{x-1}$ on the interval [2, 7]. If not, state why not. If so, determine the point(s) that are guaranteed to exist by the Mean Value Theorem.

5. Let $f(x) = Ax^3 - 3x^2 + 5$ on the interval from [0,3]. Determine the value of A such that $x = 2$ is the point guaranteed to exist by the Mean Value Theorem.

For Problems 6-9, use L'Hopital's Rule to evaluate the limits analytically.

6. $\lim\limits_{t\to\infty}\left(1+\dfrac{9}{t^3}\right)^{t^3}$

7. $\lim\limits_{y\to 0}\left(\ln(1+3y)\right)^{\frac{4}{y}}$

8. $\lim\limits_{x\to\infty} x - \sqrt{x^2 - 5x + 3}$

9. $\lim\limits_{x\to-\infty} (x^2 - 3x + 4)e^x$

10. For the following functions below, use L'Hopital's Rule to place the functions in order from the slowest growing to the fastest growing functions. **You cannot state Theorem 4.15 as your justification**—you must show by evaluating limits!

$f(x) = (x-4)^3$ $\qquad g(x) = e^{x^2-5x}$ $\qquad h(x) = \ln\sqrt{x+1}$ $\qquad j(x) = 2^{2x}$