CLS Homework #6 Notes and Common Errors

Homework Due: 3 March 2019
Problems Graded: 3.2.1, 3.2.5, and 3.3.10

- General Notes -

1. First of all I want to say well done! This was probably the best homework yet, so keep up the good work!

- Problem 3.2.1 -

1. If you missed any of these please go back and review your exponent rules. If you have questions feel free to talk to either Eric or me during office hours.

- Problem 3.2.5 -

1. Please make sure to read questions carefully. The exponent on e in this problem was 0.12 **not** 12, as many of you thought. I didn't take off points if this was your *only* error in the problem this time, but this will not be the case on the exam.
2. The question also asks you to check the doubling time from 400 to 800 and 800 to 1600. You either needed to do this explicitly or appeal to an argument similar to the one on the first page of last week's tutorial to receive full credit.

- Problem 3.3.10 -

1. This was probably the hardest question on the homework this week. We are supposed to determine the derivative of $\sqrt[3]{x}$ without the use of the power rule or the definition of derivative. We are given that for the function $f(x) = x^3$, $f'(x) = 3x^2$. Notice, this then gives us that for $g(x) = \sqrt[3]{x}$, $f(g(x)) = x$ and $f'(g(x)) = 3(\sqrt[3]{x})^2$. Next, we have that

$$\frac{d}{dx}[f(g(x))] = \frac{d}{dx}[x].$$

Applying the chain rule, we then get that

$$f'(g(x)) \cdot g'(x) = 1.$$

We then divide to get

$$\frac{d}{dx}[\sqrt[3]{x}] = g'(x) = \frac{1}{f'(g(x))} = \frac{1}{3(\sqrt[3]{x})^2}$$

as desired.