My Office Hours: M & W 2:30–4:00, Tu 2:00–3:30, & F 1:30–2:30 or by appointment. **Math Intern:** Sun: 2:00–5:00, 7:00–10pm; Mon thru Thu: 3:00–5:30 and 7:00–10:30pm in Lansing 310. Website: `http://math.hws.edu/~mitchell/Math131F15/index.html`.

☕ *Practice*

1. **Review** L'Hopital's Rule in Section 4.7 and the online notes. More interesting ones have the form $0 \cdot \infty$, 0^0, ∞^0, 1^∞, and $\infty - \infty$.

(*a*) **Read** all of 7.7 on improper integrals which we continue to discuss next time.

2. (*a*) Suggested last time. l'Hôpital's's Rule: Try page 307ff #13, 19–31(odd), 49, 53, 55, 65.

(*b*) Interesting ones of the form $0 \cdot \infty$, 0^0, ∞^0, 1^∞, and $\infty - \infty$. Page 307ff #45, 49, 53, 55, 65, and 67.

Hand In

These should be quick. Some are WeBWorK problems. Potential answers: k, k^2, 0, 1, 2, 1/2, 1/4, $\ln 2$, $\ln 3$, e^2, e^{-2}, diverges, e.

0. Start WeBWorK `Day27`—many of these are the same as the hand in problems—and finish `Day26`.

1. Evaluate these limits using L'Hôpital's Rule when appropriate. In part (b), k is a non-zero constant. Use correct limit notation.

(*a*) $\lim_{x\to 0^+} x^2 \ln x$ WeBWorK (*b*) $\lim_{x\to\infty} x\tan(\frac{1}{x})$ WeBWorK (*c*) $\lim_{x\to\infty}\left(1-\frac{2}{x}\right)^x$ WeBWorK

(*d*) $\lim_{x\to 0}\frac{\sin kx}{\arcsin x}$ (*e*) $\lim_{x\to 0^+} x^{3x}$ WeBWorK (*f*) $\lim_{x\to\infty}\ln(2x-2)-\ln(x+7)$ WeBWorK

2. Page 578 #6. Use correct limit notation. Similar to a WeBWorK problem.

3. Determine $\int_0^\infty \frac{4}{\sqrt[3]{x+1}}\,dx$. Use correct limit notation. Similar to a WeBWorK problem.

4. Determine $\int_0^\infty 2xe^{-x^2}\,dx$. Use correct limit notation.

5. Determine $\int_0^\infty \frac{4}{1+x^2}\,dx$. Use correct limit notation.

6. Suppose that a tank is formed by rotating the region in the first quadrant enclosed by $y = (x+2)^2$, the y-axis, and the x-axis about the y-axis (see Figure 1).
Just set up the integral for the work done pumping the oil ($D = 60$ lbs/ft^3) to a height 3 feet above the top of the tank if there is only 1 foot of oil in the tank.

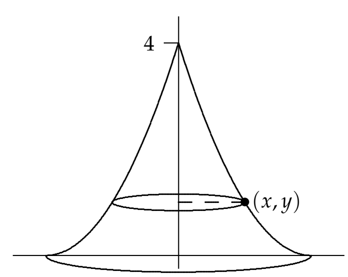

Figure 1: The circular cross-section formed by rotating the point (x, y) about the y-axis.

7. BONUS: Determine $\lim_{x\to 0^+}(\tan x)^x$. Hint: Use the "log process." After applying L'Hôpital's Rule the first time, simplify and apply again. (Also a WeBWorK Bonus problem.)