Math 1181H (§110) – Dec. 5, 2018   Full Name: ______________________

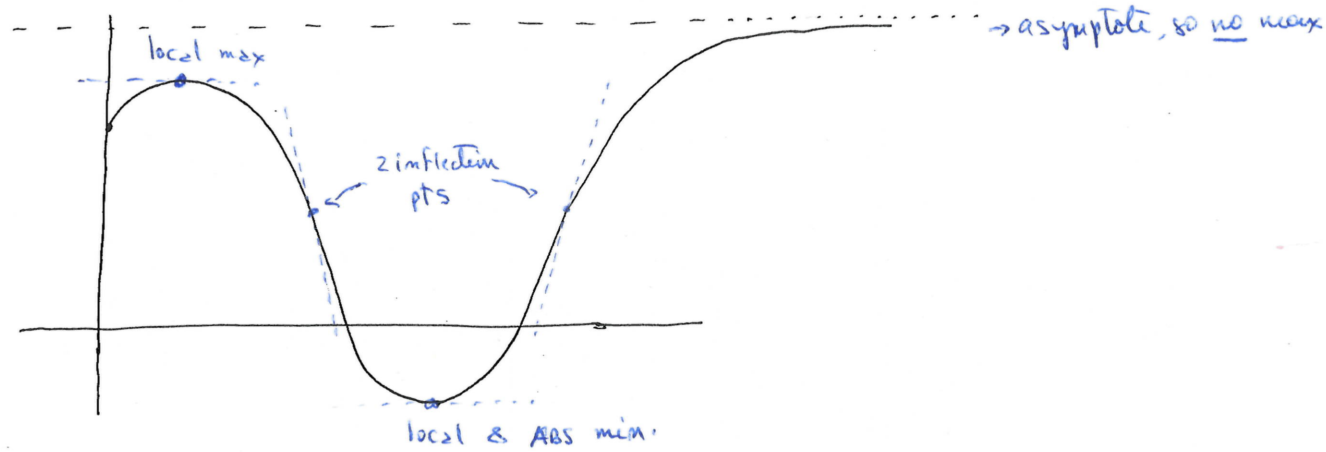
Quiz 4

Decide if the following statements are True or False. **NOTE: No justification is needed.**

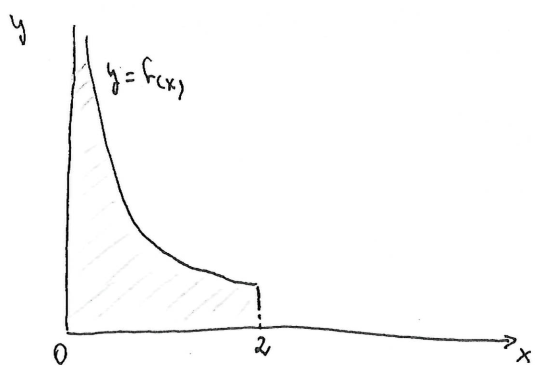
Problem 1. T F $\lim_{x\to\infty} x^2 e^{-x} = 0$.

$\lim_{x\to\infty} \frac{x^2}{e^x} \overset{\infty/\infty}{=} \lim_{x\to\infty} \frac{2x}{e^x} \overset{\infty/\infty}{=} \lim_{x\to\infty} \frac{2}{e^x} = 0$

Problem 2. T F The function depicted below has an absolute minimum, no absolute maximum and one inflection point.



Problem 3. T F The area under the following curve is always finite but the volume obtained by rotation about the x-axis is not necessarily finite.



Ex: $f_1(x) = \frac{1}{x}$ $\text{Area}_1 = \int_0^2 \frac{dx}{x} = \ln x \Big|_0^2 = \infty$

$f_2(x) = \frac{1}{\sqrt[4]{x}}$ $\text{Area}_2 = \int_0^2 \frac{dx}{\sqrt[4]{x}} = \frac{4}{3}(x)^{\frac{3}{4}}\Big|_0^2 = \frac{3\sqrt[3]{16}}{4} = \frac{3}{2}\sqrt[3]{2}$

$\text{Vol}_1 = \int_0^2 \pi\left(\frac{1}{x}\right)^2 dx = \pi\left(\frac{-1}{x}\right)\Big|_0^2 = \infty$

$\text{Vol}_2 = \int_0^2 \pi\left(\frac{1}{\sqrt[4]{x}}\right)^2 dx = \int_0^2 \pi \frac{1}{\sqrt{x}}\, dx = \pi 2\sqrt{x}\Big|_0^2 = 2\pi\sqrt{2}$

Problem 4. T F The series $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^{1.3}}$ converges absolutely.

$\sum_{n=0}^{\infty} \frac{1}{n^{1.3}}$ is p-series with $p > 1$ so it converges.

Problem 5. T F The function $\tan(x)$ has a power series expansion about 0 with infinite radius of convergence.

$\tan(\frac{\pi}{2})$ is not defined