Due Sunday, February 18, 2024 in Gradescope by 11:59 pm ET

Instructions:

• This is an Open Notes Quiz. You can use materials, homeworks problems, lecture notes, etc. that you manually worked on.

• This is **NOT** an Open Internet Quiz. You can only access our Main Course Webpage.

• You are not allowed to work on or discuss these problems with other students or people.

• You can ask a few small, clarifying, questions in Office Hours, but the problems will not be solved for you.

• The main goal is to make a thoughtful and detailed presentation for the solutions. Submit a clear final draft. No mess please.

• Please submit your final work in Gradescope in the Quiz 3 entry.

1. [10 Points] Show that $$\lim_{x \to 0} \frac{\ln(1 - 5x) + \arcsin(5x)}{3xe^x - \arctan(3x)} = \boxed{-\frac{25}{6}}$$

2. [10 Points] Show that $$\lim_{x \to \infty} \left(1 - \frac{8}{x^3}\right)^{x^3} = \boxed{e^{-8}}$$

3. [10 Points] Show that $$\lim_{x \to 0^+} x^3 \ln x = \boxed{0}$$

4. [10 Points] Show that $$\lim_{x \to \infty} \left(1 - \arctan\left(\frac{3}{x^4}\right)\right)^{x^4} = \boxed{e^{-3}}$$

5. [10 Points] Show that $$\int_1^{\sqrt{3}} x \arctan x \, dx = \boxed{\frac{5\pi}{12} - \frac{\sqrt{3}}{2} + \frac{1}{2}}$$