

Due Sunday, March 1, 2026 in Gradescope by 11:59 pm

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, professor, Math Fellow TA or simply put anyone.
- 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 4 entry.

1. [10 points] Evaluate each of the Limits. You may need to use algebra to decompose the Limit into simpler pieces. Also use arrows to show the size arguments, either growing large towards ∞ and/or small towards 0. **Simplify**.

$$(a) \lim_{n \rightarrow \infty} \frac{50}{n^3} \left(\frac{n(n+1)(2n+1)}{6} \right) - \frac{100}{n^2} \left(\frac{n(n+1)}{2} \right) + \frac{66}{n}(n) =$$

$$(b) \lim_{n \rightarrow \infty} \frac{18}{n}(n) - \frac{18}{n^2} \left(\frac{n(n+1)}{2} \right) - \frac{27}{n^3} \left(\frac{n(n+1)(2n+1)}{6} \right) =$$

2. [10 points] Here i and n are some constants. **Simplify**, combine similar variables.

$$(a) \text{ Consider } f(x) = 5 - 4x - 3x^2. \text{ Compute } f\left(-2 + \frac{3i}{n}\right).$$

$$(b) \text{ Consider } f(x) = x^2 - 4x - 7. \text{ Compute } f\left(-3 + \frac{4i}{n}\right).$$

3. [10 points] Show that

$$\sum_{i=1}^n \left[6 - 3 \left(-3 + \frac{4i}{n} \right) - 2 \left(-3 + \frac{4i}{n} \right)^2 \right] \cdot \left(\frac{4}{n} \right) = \boxed{-12 + \frac{144}{n^2} \sum_{i=1}^n i - \frac{128}{n^3} \sum_{i=1}^n i^2}$$

DO NOT SPEAK TO ANYONE ELSE ABOUT THIS QUIZ