Comments on Midterm 2.

The mean grade was 37.6/50 (the test was counted out of 50, not 53). Q1 (b) was not done well. \( \ell(\gamma) = \sup \{ D(\gamma, P) : P \text{ a partition of } [a, b] \} \) is the definition of length (and you need to define \( D(\gamma, P) \)); \( \ell(\gamma) = \int_a^b \| \gamma'(t) \| dt \) is a Theorem which requires a continuous speed \( \| \gamma'(t) \| \). Note the question indicated the derivative may not exist so the latter integral may not even exist.

Q2. (c) also proved to be challenging—see the solutions. Note that \( \lim_{n \to \infty} (1 - n^{-2})^n = 1 \) but NOT BECAUSE \( 1 + n^{-2} \to 1 \) and \( 1^n = 1 \). The latter reasoning would also show \( \lim_{n \to \infty} (1 - n^{-1})^n = 1 \) and we know the answer is \( e \).

Q3 was done reasonably well and Q4 was done better than expected. Note that the solution to 4(a) is very close to that of Q4(a) on the practice midterm—in fact it is the same question if \( b_n = a_n \).