

Due: Wednesday, February 27th

1. Do Exercise 7.5.I in the text.
2. Do Exercise 8.1.I in the text.
3. For each of the following sequences of functions, determine if the sequence converges uniformly (to some function) on the given interval.

(a) $f_n(x) = \frac{x^2}{x^2 + (nx - 1)^2}, \quad [0, 1],$

(b) $g_n(x) = \frac{nx^2}{1 + nx}, \quad [0, 1],$

(c) $h_n(x) = (1 + x^n)^{1/n}, \quad [0, +\infty).$

HINT: For (c), it may help to show $(1 + x^n)^{1/n} \leq x + 1/n$ for $n \in \mathbb{N}$ and $x \geq 1$ (using something like the first paragraph of Proposition 3.3.1).

4. Do Exercise 8.1.K in the text.