Let $D = (0, 1)$.

a) Provide a sequence of functions $f_n : D \to \mathbb{R}$ that converges **uniformly** to some function $f : D \to \mathbb{R}$ on D. *Justify your answer.*

b) Provide a sequence of functions $f_n : D \to \mathbb{R}$ that converges **pointwise but not uniformly** to some function $f : D \to$ on D. *Justify your answer.*

c) Provide a sequence of functions $f_n : D \to \mathbb{R}$ that converges **uniformly on every compact subinterval of** D, but not on the full interval D. *Explain how this function meets both conditions.*

d) In what sense is uniform convergence on compact subintervals the most appropriate notion of convergence on the open interval D?