Problems - 9.3

(1) Show that the sequence $\{f_n\}$ converges to f for each x in I. Determine whether or not the convergence is uniform.

$$f_n(x) = \frac{2x}{1 + nx}, \qquad f(x) = 0, \qquad I = [0, 1]$$

(4) Show that the sequence $\{f_n\}$ converges to f for each x in I. Determine whether or not the convergence is uniform.

$$f_n(x) = \frac{n^3 x}{1 + n^4 x^2}, \qquad f(x) = 0, \qquad I = [1, \infty)$$

(5) Show that the sequence $\{f_n\}$ converges to f for each x in I. Determine whether or not the convergence is uniform.

$$f_n(x) = \frac{nx^2}{1 + nx}, \qquad f(x) = x, \qquad I = [0, 1]$$