

4. [12 points] Consider the following sequences:

$$f_n = \frac{\pi^n}{e^n} \quad g_n = (-1)^n \sin(n) \quad h_n = \cos(e^{-n}) \quad i_n = \int_1^n \frac{1}{(x+3)^2} dx$$

For each sequence, circle **all** that apply. No justification is necessary.

a. [2 points] The sequence (f_n) is :

Bounded

Increasing

Decreasing

b. [2 points] The sequence (g_n) is :

Bounded

Increasing

Decreasing

c. [2 points] The sequence (h_n) is :

Bounded

Increasing

Decreasing

d. [2 points] The sequence (i_n) is :

Bounded

Increasing

Decreasing

e. [4 points] For each given sequence, if it converges, determine its limit and write that limit in the space provided. If the sequence diverges, write “diverges”. No justification is necessary.

(f_n) : diverges

(h_n) : 1

(g_n) : diverges

(i_n) : 1/4