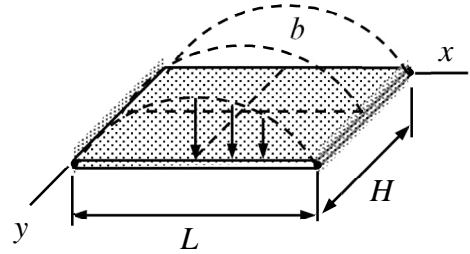


Name _____ Student number _____

Assignment 4 (4p)

A rectangular plate of size $L \times H$ and thickness t is loaded by $b_n = b \sin(\pi x / L)$ in the transverse direction. The plate is simply supported on edges where $x \in \{0, L\}$ and free on the edges where $y \in \{0, H\}$. Assuming that the material parameters E , ν are constants, find the amplitude a_0 of transverse displacement $w = a_0 \sin(\pi x / L)$ so that the bi-harmonic equation for the transverse displacement is satisfied. Start with the invariant form of the bi-harmonic equation $D \nabla_0^2 \nabla_0^2 w - b_n = 0$.



Answer $a_0 = \left(\frac{L}{\pi}\right)^4 \frac{b}{D}$