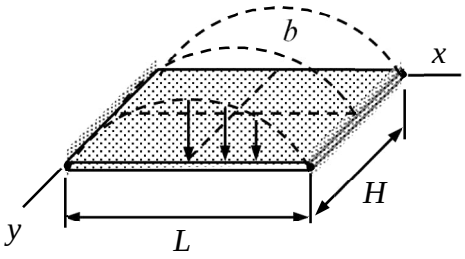
Name_____ Student number_____

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 $w = \mathrm{a}_0 \sin(\pi x / L)$ 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 $\mathrm{a}_0 = (\frac{L}{\pi})^4 \frac{b}{D}$