1. $-\nabla^2 u = 2000 \qquad \Omega = (0,1)\times(0,1)$

$u = 0, \quad \partial\Omega = \Gamma$

$\Downarrow$

$$-(u_{xx}+u_{yy})v = 2000v \longrightarrow -\int_0^1\int_0^1 (u_{xx}+u_{yy})v \overset{dxdy}{=} \int_\Omega 2000v\,dA$$

$$-\int_0^1\int_0^1 u_{xx}v\,dx\,dy - \int_0^1\int_0^1 u_{yy}v\,\underbrace{dy\,dx}_{\text{cambiado órden}} = \int_\Omega 2000v\,dA$$

$$\int_0^1\left(-v\cdot\overset{0}{\cancel{u_x}}\Big|_0^1 + \int_0^1 u_x v_x\,dx\right)dy + \int_0^1\left(-v\cdot\underset{0}{\cancel{u_y}}\Big|_0^1 + \int_0^1 u_y v_y\,dy\right)dx = \int_\Omega 2000v\,dA$$

$$\int_0^1\int_0^1 u_x v_x\,dx\,dy + \int_0^1\int_0^1 u_y v_y\,\underbrace{dx\,dy}_{\text{cambiando órden}} = \int_\Omega 2000v\,dA$$

$$\underline{\int_\Omega \nabla u\cdot\nabla v\,dA = \int_\Omega 2000v\,dA}$$