#P3

$u'' = \sin(2\pi x)$, $u'(0) = 0$, $u'(1) = 0$

directly integrate:

$u' = -\frac{1}{2\pi}\cos(2\pi x) + a$, apply $u'(0) = 0$, $a = \frac{1}{2\pi}$.

Again

$u = -\frac{1}{4\pi^2}\sin(2\pi x) + \frac{1}{2\pi}x + b$.