Boundary Conditions Replace Initial Conditions

Our problem is little different. Because we don't have two initial conditions, as we normally have for a second-order differential equation. Instead, we have two boundary conditions.

$$-\frac{d^2y}{dx^2} = f(x)$$

we are changing t to x because we are thinking of this as a problem in space rather than in time. Here is the new thing $y(0) = 0, y(1) = 0$. Not a big difference but you will see that it's an entirely new type of problem. As far as the solution to the equation goes, there is nothing enormously new.

$$y(x) = y_p + Cx + D$$

We substitute into the boundary conditions.