tinal Project:

1)

$$U_t \cdot U_{xx} = f(x,t), \quad (x,t) \in (0,1) \times (0,1), \quad f(x,t) = (\pi^2 - 1)e^{-t}\sin(\pi x)$$

W initial bandary conditions

 $U(x,0) = \sin(\pi x)$
 $U(x,t) = e^{-t}\sin(\pi x)$
 $U(x,t) = e^{-t}\sin(\pi x)$
 $U(x,t) = e^{-t}\sin(\pi x)$

$$U(x,0) = Sin(2\pi x)$$

 $U(0,t) = U(1,t) = 0$

$$\mathcal{U}_{t} - \mathcal{U}_{xx} = \mathcal{G}(x, t)$$

$$\int_{0}^{1} \frac{Su}{St} v(x) dx - \int_{0}^{1} \frac{Su}{Sx^{2}} v(x) dx = \int_{0}^{1} f(x,t) v(x) dx$$

$$\frac{L_{1}\int_{0}^{1}\frac{Su}{St}v(x)dx-L\frac{Su}{Sx}v(x)J_{0}^{1}+J_{0}^{1}\frac{Su}{Sx^{2}}v'(x)dx=\int_{0}^{1}f(x,t)v(x)dx}{\int_{0}^{1}\frac{Su}{St}v(x)dx-L\frac{Su}{Sx^{2}}v'(x)dx}=\int_{0}^{1}f(x,t)v(x)dx$$

$$\sum_{x} \frac{Su}{3} \frac{y(x)}{3} = \frac{1}{3} \frac{Su}{3x^2} \frac{y'(x)}{3x} dx + \text{let } V(x) = \Phi(x)$$

$$= \frac{1}{3} \frac{Su}{3x^2} \frac{$$

$$-7 \int_{0}^{1} \frac{Su}{St} \cdot \Phi(x) dx + \int_{0}^{1} \frac{Su}{Sx^{2}} \frac{S\Phi_{i}}{Sx} dx = \int_{0}^{1} f(x,t) \Phi(x) dx$$

$$L_{7} \int_{0}^{1} \frac{Su}{St} \cdot \Phi(x) dx + \int_{0}^{1} \frac{Su}{Sx^{2}} \frac{S\Phi_{i}}{Sx} dx - \int_{0}^{1} f(x,t) \Phi(x) dx = 0$$

 $U(x,t) = e^{-t} \sin(\pi x)$

 $\frac{\delta U}{S_1} = -e^{-t} \sin(2x)$

 $\frac{gu}{sx} = 7re^{t} cos(2rx) :: \frac{gu}{sx^{2}} = -7r^{2}e^{t} sin(2rx)$