Math 470- Quiz 2

ID. Num.: Name:

Question: Let $u = u(x,t)$ be the solution of the problem:

$$u_t = u_{xx} + te^{x-t}, \quad x \in (0,\pi), \quad t > 0$$

$$u(0,t) = e^{-t}, \quad u(\pi,t) = sin(\pi t), \quad t \geq 0; \quad u(x,0) = 1, \quad x \in [0,\pi].$$

Let also $w = w(x,t)$ be the solution of

$$w_t = w_{xx} + te^{x-t}, \quad x \in (0,\pi), \quad t > 0$$

$$w(0,t) = \pi, \quad w(\pi,t) = 2, \quad t \geq 0; \qquad w(x,0) = x, \quad x \in [0,\pi].$$

Use the weak maximum principle to find the best upper bound for $|u(x,t) - w(x,t)|$.