NMA – homework from week **10**

Consider mixed problem for wave equation

$$\frac{\partial^2 u}{\partial t^2} = 4\,\frac{\partial^2 u}{\partial x^2} + xt \quad \text{on} \quad \Omega = \{[x,t] : x \in (0,3),\ t > 0\}\ ,$$
$$u(x,0) = 0, \quad \tfrac{\partial u}{\partial t}(x,0) = 1, \quad u(0,t) = 5t^2 + t, \quad u(3,t) = \sin t$$

a) Choose spatial step-size $h = 0.5$ and time step-size $\tau = 0.2$ and find an approximate value of $u(0.5, 0.4)$ using the explicit scheme.

b) Will the explicit scheme be stable for the choice of $h = 0.5$ and $\tau = 0.2$? Justify your answer.