Show your work to earn credit ! Due on Wednesday, May 3, 2023

1.   Find the d'Alembert solution of the initial-value problem

$$u_{tt} = u_{xx} , \quad -\infty < x < \infty, \, t > 0 ,$$

$$u(x,0) = \sin x , \quad u_t(x,0) = x\,e^{-x^2} .$$

Be sure to evaluate any integrals.

2.   For the wave equation

$$u_{tt} = u_{xx} ,$$

write the following solutions in d'Alembert form:

(a) $\cos x \cos t$,

(b) $t^3 + 3tx^2$.