

$$\begin{aligned} f(x, t) = x^9 e^{-ct} &\Rightarrow f_t = x^9(-ce^{-ct}), \quad f_{tt} = x^9(c^2 e^{-ct}), \\ f_{ttt} = x^9(-c^3 e^{-ct}) &= -c^3 x^9 e^{-ct} \quad \text{and} \\ f_{tx} = 9x^8(-ce^{-ct}), \quad f_{txx} &= 72x^7(-ce^{-ct}) = -72x^7 ce^{-ct}. \end{aligned}$$