Optics and Waves, Week 2

(a) Explain why any wave described by a function of the form $y(x,t) = f(x - vt)$ moves in the + x direction with speed v.

(b) Show that $y(x,t) = f(x - vt)$ satisfies the wave equation, no matter what the functional form of f.

(c) A wave pulse is described by the function $y(x,t) = De^{-(Bx-Ct)^2}$, where B, C, and D are all positive constants. Show that this wave function satisfies the wave equation and hence find the speed of this wave.