Partial differential equations - Check your understanding

□ What are boundary conditions? What are initial conditions? Give examples. Explain what they mean, in practical terms.

□ What are Dirichlet boundary conditions? What are Neumann boundary conditions? What do they mean?

□ Why do we need 2 initial conditions for the wave equation and only one for the heat equation?

□ Why do we take a linear combination of normal modes to write down the general solution to the wave equation (or to the heat equation)?

□ Would the method of separation of variables work for a nonlinear PDE? Why or why not?

□ Would the method of convolution work for a nonlinear PDE? Why or why not?

□ Do you understand how to use initial conditions to find the coefficients that appear in the normal mode expansion of the solution to the wave equation (or to the heat equation), for given boundary conditions?

□ When using the method of separation of variables, why is it important to know whether it is possible to write the equation for the space variable(s) in Sturm-Liouville form?

□ How are normal modes found? Why are they useful?