Quiz 3 **Name:** _____

MATH 3150, Section 004 January 30, 2019

For all the following multiple-choice questions, circle your answers clearly. No partial credit will be awarded; any scratch work will be ignored.

1. Which of the following is an appropriate "guess" for the solution $u(x,t)$ that one uses in the first step of the method of separation of variables?

(a) $u(x,t) = T(t)$

(b) $u(x,t) = 0$

(c) $u(x,t) = u_e(x)$

(d) $u(x,t) = \phi(x)T(t)$

(e) $u(x,t) = f(x)$

2. We have seen an integral condition of the form

$$\int_0^L \sin\left(\frac{n\pi x}{L}\right)\sin\left(\frac{m\pi x}{L}\right)\mathrm{d}x = \begin{cases} 0, & m \neq n \\ L/2, & m = n \end{cases}$$

What is the mathematical name given to a relation of this form?

(a) Separation of variables

(b) An orthogonality condition

(c) The equilibrium or steady-state solution

(d) An ordinary differential equation

(e) Integration by parts

3. What is the end goal of the method of separation of variables?

(a) The heat equation is derived using separation of variables

(b) It is used to compute the equilibrium solution for a PDE

(c) To compute the full solution to a PDE problem

(d) Ensuring conservation of energy is equivalent to separating variables

(e) Deciding whether or not a PDE is linear requires separation of variables