1. Find product solutions, if possible, to the partial differential equation
\[ \frac{\partial u}{\partial x} + 5 \frac{\partial u}{\partial y} = 0. \]

2. Find product solutions, if possible, to the partial differential equation
\[ 11 \frac{\partial u}{\partial x} - 5 \frac{\partial u}{\partial y} = 0. \]

3. Find product solutions, if possible, to the partial differential equation
\[ \frac{x}{\partial x} = \frac{y}{\partial y}. \]

4. Find product solutions, if possible, to the partial differential equation
\[ \frac{\partial^2 u}{\partial x^2} = 9 \frac{\partial u}{\partial y}. \]

5. Find product solutions, if possible, to the partial differential equation
\[ \frac{\partial^2 u}{\partial x^2} - u = 9 \frac{\partial u}{\partial t}. \]

6. Find product solutions, if possible, to the partial differential equation
\[ \frac{\partial^2 u}{\partial x^2} + 3 \frac{\partial^2 u}{\partial x \partial y} + \frac{\partial^2 u}{\partial y^2} = 0. \]

7. Classify the following pde as either elliptic, hyperbolic, parabolic, or none.
\[ \frac{\partial^2 u}{\partial x^2} = 10 \frac{\partial^2 u}{\partial x \partial y} - 2 \frac{\partial^2 u}{\partial y^2} + 11 \frac{\partial u}{\partial x} - 9 \frac{\partial u}{\partial y}. \]

8. Classify the following pde as either elliptic, hyperbolic, parabolic, or none.
\[ \frac{\partial^2 u}{\partial y^2} = 2 \frac{\partial^2 u}{\partial x \partial y} + \frac{\partial^2 u}{\partial x^2} + \frac{\partial u}{\partial x} - 4 \frac{\partial u}{\partial y}. \]