## Dr. Z.'s Calc5 Homework assignment 13

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

$$11\frac{\partial u}{\partial x} - 5\frac{\partial u}{\partial y} = 0$$

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3. Find product solutions, if possible, to the partial differential equation

$$x\frac{\partial u}{\partial x} = y\frac{\partial u}{\partial y} \quad .$$

4. Find product solutions, if possible, to the partial differential equation

$$\frac{\partial^2 u}{\partial x^2} = 9 \frac{\partial u}{\partial y}$$

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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, parablic, 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, parablic, or none.

$$\frac{\partial^2 u}{\partial y^2} = 2\frac{\partial^2 u}{\partial x \partial y} + \frac{\partial^2 u}{\partial x^2} + \frac{\partial u}{\partial x} - 4\frac{\partial u}{\partial y}$$