

MAT 129: Homework #1 Due Monday, April 5, 2010

Exercise 1.1.1 Show that $u(x, t) = t^{-1/2} \exp(-x^2/4kt)$ satisfies the heat equation $u_t = ku_{xx}$ for $t > 0$.

Exercise 1.1.3 Show that $u(x, y) = \log(x^2 + y^2)$ satisfies Laplace's equation $u_{xx} + u_{yy} = 0$ for $(x, y) \neq (0, 0)$.

Exercise 1.1.4 Show that $u(x, y, z) = (x^2 + y^2 + z^2)^{-1/2}$ satisfies Laplace's equation $u_{xx} + u_{yy} + u_{zz} = 0$ for $(x, y, z) \neq (0, 0, 0)$.