Math 46 Homework 8
Due May 22 at the beginning of class

(1) Page 346 # 6
(2) Page 345 # 2. a. [Hint: get the general solution with y held const]
d. [If you are ever unsure you have the right solution, substitute back into the PDE to check it works!]
e.
(3) Page 345 # 3. You will need to think of how to satisfy both the boundary condition and the initial condition. Check that your solution does both. [Hint: You have to subtract something].
(4) Page 345 # 1. Note this is 1D equivalent of the heat spreading function you studied in 3D in the early dimensional analysis worksheet.
(5) Page 365 # 3.
(6) Page 365 # 5. Here you derive that the radial part of the Laplace operator in 3D cylindrical (or 2D polar) coordinates is $\frac{1}{r}\frac{\partial}{\partial r}\left(\frac{1}{r}\frac{d}{dr}\right)$.
(7) Page 366 # 11. Note that z is the only dimensionless parameter you can make from x, k and t. The situation is sticking an initially uniform-temperature rod against a hot oven at constant temperature; also it gives the probability of having hit the left wall in a random walk (see 6.2.4 for random walk connection).
(8) Page 367 # 13. Cute that energy method can work for some non-linear PDEs too.