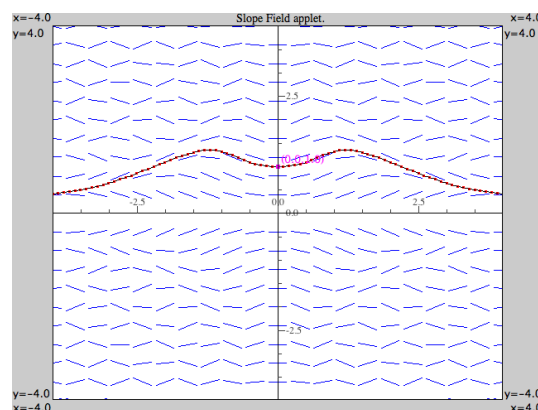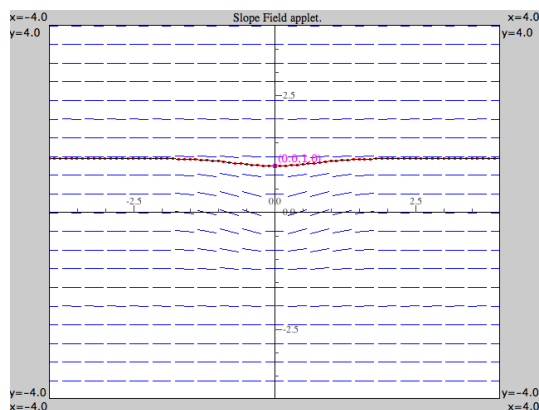# TMATH 125 Quiz 4

Show *all* your work (numerically, algebraically, or geometrically) for each and simplify. No credit is given without supporting work.

1. [3] (dif eq wks #2) Match the differential equations with the solutions graphs. Briefly *justify* your choice.

   (a)$y' = xe^{-x^2-y^2}$ 　　　　　　　　　　　　　　(b) $y' = \sin(xy)\cos(xy)$

2. [3] (§9.3 #13) Find the solution of the differential equation that satisfies the given initial condition:

$$\frac{du}{dt} = \frac{2t + \sec^2(t)}{2u} \qquad\qquad u(0) = -5$$

3. [4] (WebHW13 #7) A vat with 200 gallons of beer contains 4% alcohol (by volume). Beer with 6% alcohol is pumped into the vat at a rate of 2 gal/min and the mixture is pumped out at the same rate. Let $A(t)$ be the amount of alcohol in the vat at time t and set up a differential equation modeling the described situation. Do *not* solve the differential equation, but do justify the differential equation you set up.