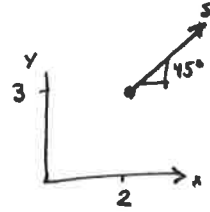


AEM 614 HW #1

Due 2nd Sept 2015 at 5pm.

1) Given a field $p(x,y) = x^3y + y^2 + 3$, find:

- ∇p at $(x,y) = (2,3)$
- Directional derivative at 2,3 along $+45^\circ$ line



2) A tube has a temperature profile of $T(x,t) = T_0 e^{-\frac{x}{L}} (C + \sin(\frac{\omega t}{T}))$



A particle moves with velocity $U(x) = U_0 (\frac{x}{L})^2$ starting at $x=0$ at $t=0$

Find the rate of change in temperature:

- At $x = \frac{L}{2}$
- At the particle's position

3) A Cessna 172 manual claims a stall speed at a particular flight condition of 48 mph at SSL. At what airspeed would the 172 stall at Lake County Airport (KLXV) near Leadville, CO on a hot 75°F day with 80% relative humidity? Assume pressures are std. for the altitude.

4) Verify that you viewed the Vorticity film at <http://tiny.cc/VorticityFilm>