SI Session: Nov. 24, 2008
Mondays: 1:30 PM – 3:00 PM & 4:50 PM – 6:20 PM
Wednesdays: 1:30 PM – 3:00 PM & 4:50 PM – 6:20 PM
Room 1239 SNAD(Wed. early rm. 1121)

Prof. Stockton : Calculus III
Fall 2008
SI Leader : Neil Jody

[1] Determine if the following vector field is conservative. If it is, find a potential function for the vector field.

(a) $\vec{F}(x,y) = 3x^2y^2\hat{i} + 2x^3y\hat{j}$

(b) $\vec{F}(x,y) = \frac{2y}{x}\hat{i} - \frac{x^2}{y^2}\hat{j}$

(c) $\vec{F}(x,y) = \dfrac{2x\hat{i} + 2y\hat{j}}{\left(x^2 + y^2\right)^2}$

(d) $\vec{F}\left(x,y,z\right)=e^{z}\left(y\hat{i}+x\hat{j}+\hat{k}\right)$

(e) $\vec{F}\left(x,y,z\right)=y^{2}z^{3}\hat{i}+2xyz^{3}\,\hat{j}+3xy^{2}z^{2}\hat{k}$

[2] Find curl $\vec{F}$ for the vector field at the given point.

(a) $\vec{F}(x,y,z) = x^2 z\hat{i} - 2xz\hat{j} + yz\hat{k}$, $(2,-1,3)$

(b) $\vec{F}(x,y,z) = e^{-xyz}\left(\hat{i} + \hat{j} + \hat{k}\right)$, $(3,2,0)$

[3] Find the divergence for the vector field $\vec{F}$.

(a) $\vec{F}(x,y,z) = xe^x\hat{i} + ye^y\hat{j}$

(b) $\vec{F}(x,y,z) = \ln\left(x^2+y^2\right)\hat{i} + xy\hat{j} + \ln\left(y^2+z^2\right)\hat{k}$