

Math 233 - October 13, 2009

Solutions

- When *and where* does a vector field has a potential function?
- What is different about the special vector field

$$G = \left(-\frac{y}{x^2 + y^2}, \frac{x}{x^2 + y^2} \right)$$

1. Compute the curl of the vector field. Find a potential function, if possible.

$$G = \left(-\frac{y}{x^2 + y^2}, \frac{x}{x^2 + y^2}, 0 \right)$$

Solution: This is just a computation and should give $\text{curl } F = (0, 0, 0)$.

A possible potential function is $\phi(x, y, z) = \arctan(y/x)$. (But this vector field is a bit tricky.)