

Identifying Potential Functions

1. Show $\mathbf{F} = \langle 3x^2 + 6xy, 3x^2 + 6y \rangle$ is conservative and find the potential function f such that $\mathbf{F} = \nabla f$.
2. Let $\mathbf{F} = (x + xy^2)\mathbf{i} + (x^2y + 3y^2)\mathbf{j}$. Show \mathbf{F} is a gradient field and find the potential function using both methods.

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