

Two Dimensional Curl

We have learned about the curl for two dimensional vector fields.

By definition, if $\mathbf{F} = \langle M, N \rangle$ then the two dimensional curl of \mathbf{F} is $\text{curl } \mathbf{F} = N_x - M_y$

Example: If $\mathbf{F} = x^3y^2 \mathbf{i} + x \mathbf{j}$ then $M = x^3y^2$ and $N = x$, so $\text{curl } \mathbf{F} = 1 - 2x^3y$.

Notice that $\mathbf{F}(x, y)$ is a vector valued function and its curl is a scalar valued function. It is important that we label this as the two dimensional curl because it is only for vector fields in the plane. Later we will see that the two dimensional curl is really just the \mathbf{k} component of the (vector valued) three dimensional curl.

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18.02SC Multivariable Calculus
Fall 2010

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