A function $f(x, y)$ is said to have a removable discontinuity at $(x_0, y_0)$ if

$\lim_{(x,y)\to(x_0,y_0)} f(x, y)$ exists but $f$ is not continuous at $(x_0, y_0)$, either because $f$ is not defined at $(x_0, y_0)$ or because $f(x_0, y_0)$ differs from the value of the limit.

1. Determine whether $f(x, y)$ *has* a removable discontinuity at (0, 0).

$$f(x, y) = \frac{x^2}{x^2 + y^2}$$

$$f(x) = \begin{cases} x^2 + 7y^2, & \text{if } (x, y) \neq (0, 0) \\ -4, & \text{if } (x, y) = (0, 0) \end{cases}$$

2.

Find $\nabla \cdot (\nabla \times \mathbf{F})$.

$$\mathbf{F}(x, y, z) = e^{xz}\mathbf{i} + 3xe^{y}\mathbf{j} - e^{yz}\mathbf{k}$$

3. Find $\nabla \times (\nabla \times \mathbf{F})$.

$$\mathbf{F}(x, y, z) = xy\mathbf{j} + xyz\mathbf{k}$$