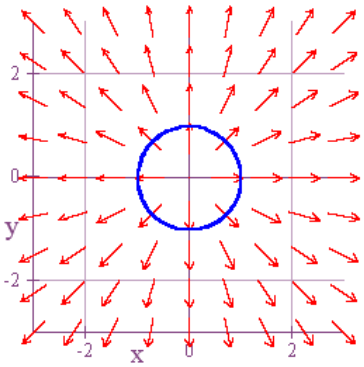
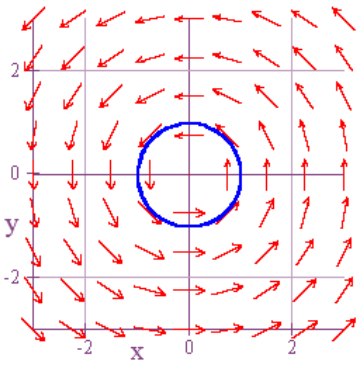
THE DIVERGENCE THEOREM

Use the Divergence Theorem (Gauss' Theorem), $Flux = \int_C \vec{F} \bullet N \, ds = \iint_R \nabla \bullet \vec{F} \, dA$, to measure the flux across the boundary of the unit circle (oriented counterclockwise) caused by each of the following vector fields.

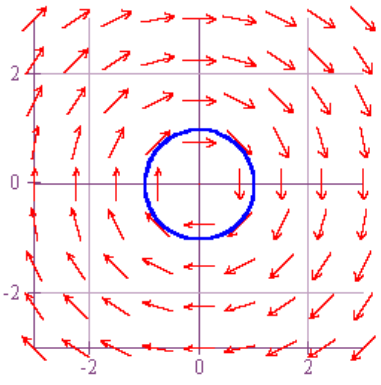
1. $\vec{F} = x\hat{i} + y\hat{j}$



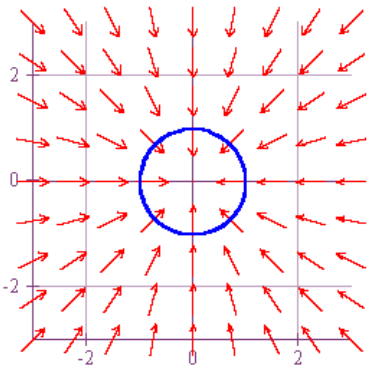
2. $\vec{F} = -y\hat{i} + x\hat{j}$



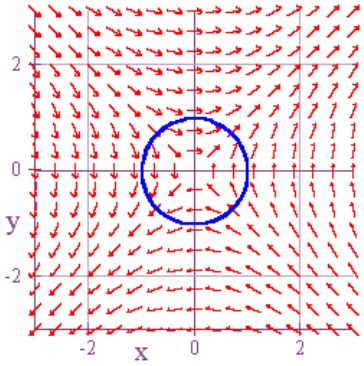
3. $\vec{F} = y\hat{i} - x\hat{j}$



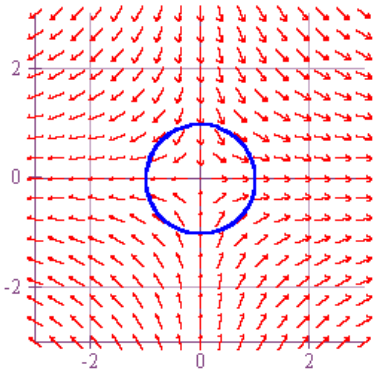
4. $\vec{F} = -x\hat{i} - y\hat{j}$



5. $\vec{F} = y\hat{i} + x\hat{j}$



6. $\vec{F} = 4x\hat{i} - 3y\hat{j}$



Answers:

1. 2π
2. 0
3. 0
4. -2π
5. 0
6. π