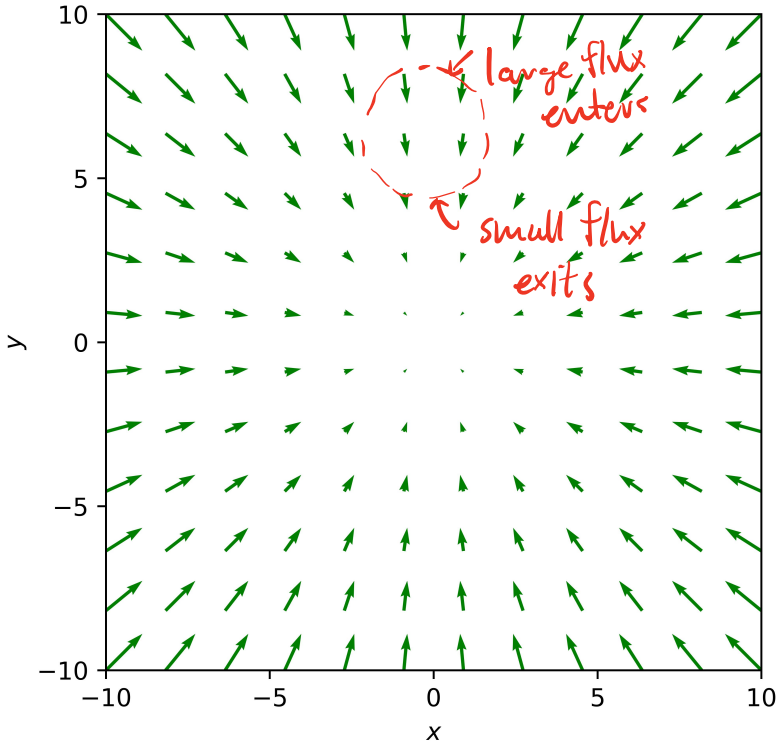
PHYSICS 301 Tutorial #1 – quiz Name: _____
September 9, 2024 Student Number: _____

(1pt) **1.**

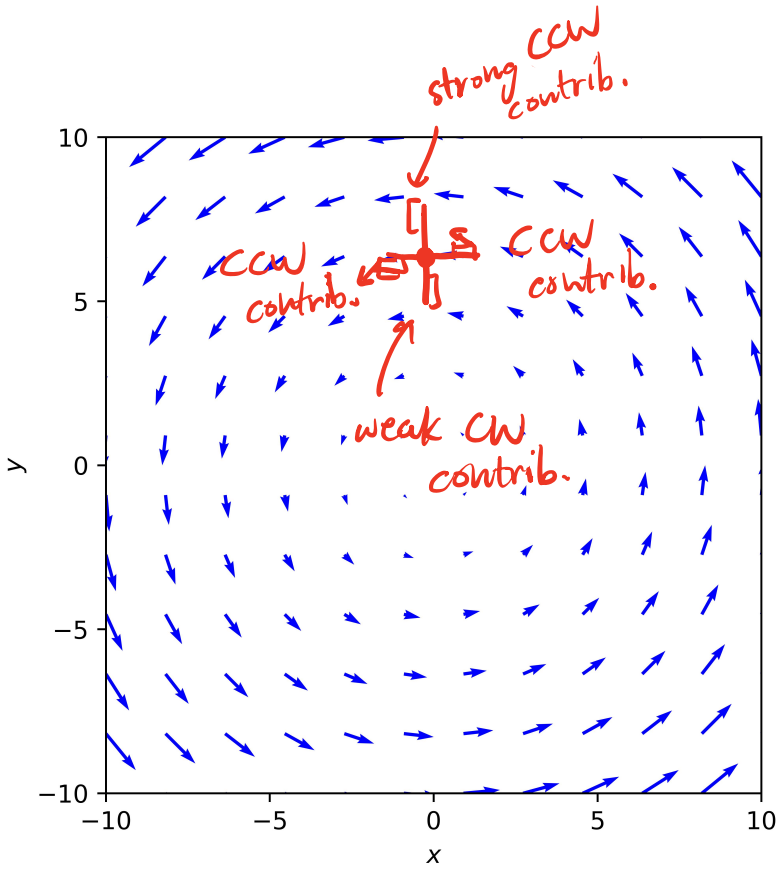


The figure above shows the electric field due to a uniform charge distribution. For example, this could be the electric field *inside* a uniformly charged sphere. Is the divergence of this vector field positive, negative, or zero? No calculations are necessary. Determine your answer by examining the vector field shown in the plot.

More flux enters top of sphere than exits the bottom. $\therefore \vec{\nabla} \cdot \vec{E} \neq 0$ in this case.

1 pt

(1pt) **2.**



The figure above shows the magnetic field due to a uniformly-distributed current. For example, this could be the magnetic field *inside* a long straight wire of diameter d carrying a uniformly-distributed current. Is the curl of this vector nonzero or zero? If it is nonzero, does $\nabla \times \mathbf{B}$ point into the page or out of the page? No calculations are necessary. Determine your answer by examining the vector field shown in the plot.

Three of the 4 arms of paddle wheel would rotate in CCW sense. Weak CW rotation due to btm of paddle too small to balance CCW rotation.

∴ since paddle wheel rotates, $\vec{\nabla} \times \vec{B} \neq 0$.

By RHR $\vec{\nabla} \times \vec{B}$ is pointing out of the screen/page.

1 pt