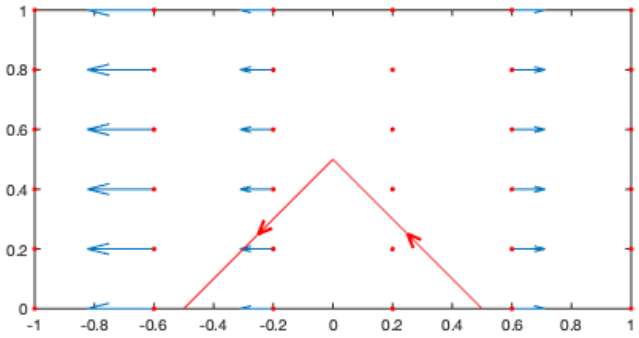
1. Assume $x, y > 0$. For $\underline{F} = y + \frac{1}{x^2}\underline{j}$, decide if
   (a) the vectors in the vector field are
   ◯ parallel to the x-axis ◯ parallel to the y-axis ◯ neither
   (b) As x increases the length of the vectors
   ◯ increases ◯ decreases ◯ neither
   (c) As y increases the length of the vectors
   ◯ increases ◯ decreases ◯ neither

2. For $\underline{v} = y\underline{i} + x\underline{j}$,
   (a) find the system of differential equations associated with the vector field.

   (b) Does the flow $x(t) = a(e^t + e^{-t}), y(t) = b(e^t - e^{-t})$ satisfy the system? *Show your calculation steps*

3. Do you expect the sign of the line integral for the pictured vector field and given curve to be positive, negative, or zero?



   Provide justification.