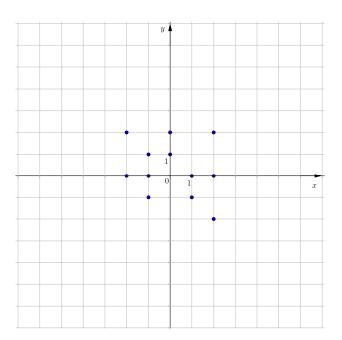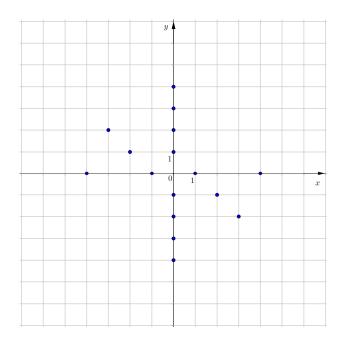1) Sketch the vector field **F** by drawing a diagram on the graph below. Draw all vectors beginning at the points plotted.

$$\vec{F}(x, y) = y\,\mathbf{i} + (x + y)\,\mathbf{j}$$

2) Sketch the vector field **F** by drawing a diagram on the graph below. Draw all vectors beginning at the points plotted.

$$\vec{F}(x, y) = y\,\mathbf{i} - x\,\mathbf{j}$$

3) Find the conservative vector field for the potential function $f(x, y) = x^\alpha e^{-\beta x}$ by finding its gradient.

4) Find the conservative vector field for the potential function $h(x, y, z) = xy \ln(x + y)$ by finding its gradient.