Please answer the following questions completely and clearly. An unsupported answer is worth few points.

(1) Using the change of variables $x = \frac{1}{4}u, y = 5v$ evaluate the integral

$$\iint_E x \, dA$$

Where the region $E$ is the ellipse $x^2 + \frac{y^2}{100} = 1$.

(2) Find the gradient vector field for $f(x, y) = x^2(y + 1) + xy$. Plot the vector field at the points $(1, 0), (0, 1), (-1, 0), (0, -1)$ and $(1, -1)$. 