Aalto university
Björn Ivarsson

Demonstration exercises 2, done during class Thursday 11.3.2021 or Friday 12.3.2021.
Differential and integral calculus 3, MS-A0311.

The solutions will be presented by the assistant during class.

(1) Determine the integral curves of the vector field $F(x, y) = (y, x)$.

(2) Determine if the vector field $F(x, y, z) = (y, x, z^2)$ is conservative or not by constructing a potential function or showing that none exist.

(3) Define
$$F(x, y) = \left(\frac{x}{x^2 + y^2}, \frac{-y}{x^2 + y^2} \right)$$
when $(x, y) \neq (0, 0)$. Determine whether this is a conservative vector field or not by constructing a potential function or showing that such cannot exist.