1. Identify the following vector fields
   
   1. \( \vec{F}_1 = (x, y) \)
   2. \( \vec{F}_2 = (y, -x) \)
   3. \( \vec{F}_3 = (x^2, 1) \)
   4. \( \vec{F}_4 = (\sin(y), x) \)
2. Calculate the scalar line integral of the function \( f(x, y, z) = x + y \) over the curve \( \vec{c}(t) = (t, \cos(t), \sin(t)) \) from \( t = 0 \) to \( t = 2\pi \).

\[
\vec{c}'(t) = \left< 1, -\sin(t), \cos(t) \right>
\]

\[
\|\vec{c}'(t)\| = \sqrt{2}.
\]

\[
\int_0^{2\pi} \left( t + \cos(t) \right) \sqrt{2} \, dt
\]

\[
= \sqrt{2} \int_0^{2\pi} t + \cos(t) \, dt
\]

\[
= \sqrt{2} \left[ \frac{t^2}{2} + \sin(t) \right]_0^{2\pi}
\]

\[
= \frac{\sqrt{2}(2\pi)^2}{2} - \sqrt{2} = 2\pi \sqrt{2}.\]