1.1)

$$\int_C z \cdot ds \quad , \quad ds = \sqrt{dx\,dx} = \sqrt{\frac{dx}{dt}\cdot\frac{dx}{dt}\cdot dt^2} = \left\|\frac{dx}{dt}\right\| \cdot dt$$

$$= \|(\cos t - t\sin t,\ \sin t + t\cos t,\ 1)\| \cdot dt$$

$$= \sqrt{-4\cos(t)\cdot\sin(t)t + t^2 + 2}\ \cdot dt$$

via maple

$$= \int_0^1 t \cdot ds = \underline{0{,}559}$$