(23) $\int_C F\,dr$ $\quad F(x,y) = \left\langle \sqrt{x+y}, \frac{y}{x} \right\rangle$ $\quad r(t) = \langle \sin^2 t, \sin t\cos t \rangle$ $t \in [\frac{\pi}{6}, \frac{\pi}{3}]$

$$r'(t) = \langle 2\sin t\cos t, \cos 2t \rangle$$

$$F(r(t)) = \sqrt{\sin^2 t + \sin t \cos t}\, i + \cot t\, j$$

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \left\langle \sqrt{\sin^2 t + \tfrac{1}{2}\sin 2t}, \cot t \right\rangle \cdot \langle \sin 2t, \cos 2t \rangle \, dt$$

$$= \int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \sin 2t \sqrt{\sin^2 t + \tfrac{1}{2}\sin 2t} + \cos 2t \cot t \, dt$$

$$\approx \boxed{0.5424}$$

(25) $\int_C xy \tan^{-1} z \, ds$ $\quad x = t^2 \quad y = t^3 \quad z = \sqrt{t} \quad t \in [1,2]$

$$ds = \sqrt{\underbrace{4t^2}_{\frac{dx}{dt}} + \underbrace{9t^4}_{\frac{dy}{dt}} + \underbrace{\frac{1}{4t}}_{\frac{dz}{dt}}}\, dt$$

$$\int_1^2 t^5 \tan^{-1}(\sqrt{t}) \sqrt{4t^2 + 9t^4 + \frac{1}{4t}}\, dt \approx \boxed{94.8231}$$