1. Calcule caso exista:

   (a)
   $$\int\int_D \frac{dxdy}{\sqrt{xy}} \qquad \text{onde} \quad D = [0,1] \times [0,1]$$

   (b)
   $$\int\int_D \frac{dxdy}{\sqrt{|x-y|}} \qquad \text{onde} \quad D = \{(x,y) \mid 0 \leq x \leq 1,\ 0 \leq y \leq 1,\ y \leq x\}$$

   (c)
   $$\int\int_D \frac{y}{x} dxdy \qquad \text{onde } D \text{ é delimitada por} \quad x = 1, x = y, x = 2y$$

   (d)
   $$\int_0^1 \int_0^{e^v} \log x \, dxdy$$

   (e) Discuta em função do parâmetro real λ:
   $$\int\int_D \frac{dxdy}{(x^2+y^2)^\lambda} \qquad \text{onde } D \text{ é o disco unitário centrado na origem}$$

2. Calcule os seguintes integrais de caminho $\int_{\vec{c}} f\, ds$:

   (a)
   $$f(x,y,z) = x + y + z \qquad \vec{c} : t \mapsto (\sin t, \cos t, t) \quad t \in [0, 2\pi]$$

   (b)
   $$f(x,y,z) = \cos z \qquad \vec{c} : t \mapsto (\sin t, \cos t, t) \quad t \in [0, 2\pi]$$

   (c)
   $$f(x,y,z) = e^{\sqrt{z}} \qquad \vec{c} : t \mapsto (1, 2, t^2) \quad t \in [0, 1]$$

   (d)
   $$f(x,y,z) = yz \qquad \vec{c} : t \mapsto (t, 3t, 2t) \quad t \in [1, 3]$$

   (e)
   $$f(x,y,z) = x \cos z \qquad \vec{c} : t \mapsto (t, t^2, 0) \quad t \in [0, 1]$$

   (f)
   $$f(x,y,z) = \frac{x+y}{y+z} \qquad \vec{c} : t \mapsto (t, \frac{2}{3}t^{2/3}, t) \quad t \in [1, 2]$$