1. $\int\int_R \frac{xy^2}{x^2+1} dA, R = \{(x,y) \in \mathbb{R}^2 : 0 \leq x \leq 1, -3 \leq y \leq 3\}$

   - $\int_{-3}^{3} \frac{xy^2}{x^2+1} dy =$
     $\frac{xy^3}{3(x^2+1)}\Big|_{-3}^{3} =$
     $18 \cdot \frac{x}{x^2+1}$
   - $18 \cdot \int_0^1 \frac{x}{x^2+1} dx =$
     $u = x^2, du = 2xdx$
     $9 \cdot \int_0^1 \frac{2x}{x^2+1} dx =$
     $9 \cdot \int_0^1 \frac{1}{u+1} du =$
     $9 \cdot \ln(u+1) du =$
     $9 \cdot \ln\big(x^2+1\big)\big|_0^1 =$
     $9(\ln(2) - \ln(1))$

2. $\int\int_R \frac{x}{1+xy} dA, R = [0,1]x[0,1]$

   - $\int_0^1 \frac{x}{1+xy} dy =$
     $u = xy, du = xdy$
     $\int \frac{x}{1+xy} dy =$
     $\int \frac{1}{1+u} du =$
     $\ln(1+xy) + C \Rightarrow$
     $\ln(1+xy)|_0^1 =$
     $\ln(1+x) - \ln(1)$
   - $\int_0^1 \ln(1+x) dx =$
     $(x+1)\ln(1+x) - x|_0^1 =$
     $2\ln(2) - 2 - \ln(1) + 1$