

1. Compute the following integrals:

$$(a) \int_{y=0}^{\frac{\pi}{2}} \int_{x=1}^2 x \sin^2 y dx dy$$

$$(b) \int_0^3 \int_0^{3-y} e^{2x+3y} dx dy$$

$$(c) \iint_T \frac{dxdy}{(x+y+1)^2}, \text{ where } T = \{(x, y) \in \mathbb{R}^2, 0 \leq x \leq 1, 0 \leq y \leq 1\}$$

$$(d) \int_0^1 \int_y^{\sqrt{y}} (x^2 + \sin xy) dx dy$$

$$(e) \int_0^1 \int_0^{\pi} (\cos(y+x) + \operatorname{arctg} 2x) dy dx$$

$$(f) \iint_{x^2+y^2 \leq 9} (5 - 3x + 4y) dx dy$$

$$(g) \iint_{x^2+y^2 \leq 4x} \sqrt{16 - x^2 - y^2} dx dy$$

$$(h) \iint_T \operatorname{arctg} \frac{y}{x}, \text{ where } T = \{(x, y) \in \mathbb{R}^2, x^2 + y^2 \leq 9, 0 \leq y\}.$$