

Solve the following integrals:

1. Sketch the region of the following integrations and change of variables:

$$(a) \int_{y=0}^1 \int_{x=y}^{\sqrt{y}} f(x, y) dx dy$$

$$(b) \int_{x=1}^2 \int_{y=x}^{2x} f(x, y) dy dx$$

$$(c) \int_{x=0}^4 \int_{y=0}^{4x-x^2} f(x, y) dy dx$$

$$(d) \int_{x=-1}^1 \int_{y=0}^{\sqrt{1-x^2}} f(x, y) dy dx$$

$$(e) \int_{y=0}^2 \int_{x=y-1}^{y+2} f(x, y) dx dy$$

$$(f) \int_{x=0}^1 \int_{y=-x}^{x^2} f(x, y) dy dx$$