

- (1) Calculate the following integral by changing the order of integration:

$$\int_0^3 \int_{-\sqrt{9-y^2}}^{\sqrt{9-y^2}} \frac{1}{\sqrt{x^2+y^2}} dx dy$$

- (2) Convert the following integral to spherical coordinates:

$$\int_0^1 \int_0^{\sqrt{1-y^2}} \int_{-\sqrt{1-x^2-y^2}}^{\sqrt{1-x^2-y^2}} \cos(z) \, dz \, dx \, dy$$

What choice of integration order makes the evaluation simplest?

- (3) Set up a triple integral for the volume of the solid bounded by the parabolic cylinder $y^2 = 4x$ and the planes $z = 0$, $z = x$, and $x = 4$.