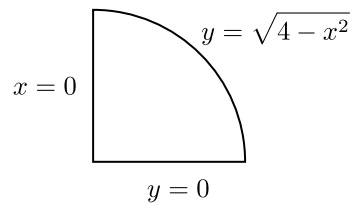


Name:

1. Let \mathcal{E} be the 3-d region determined by the inequalities $y \geq 0$, $x \geq 0$, $x^2 + y^2 \leq 4$ and $0 \leq z \leq y$. The following region in the x - y plane might help you visualize some of these inequalities.



- a. Write down an iterated integral in terms of x , y and z variables that is equivalent to

$$\iiint_{\mathcal{E}} 2x \, dV.$$

Do NOT compute the value of the integral.

- b. Ok, now go ahead and compute the value of the integral.

2. Rectangular coordinates (x, y, z) can be written in terms of spherical polar coordinates (ρ, θ, ϕ) . Simply write down what these formulas are. I.e, $x =$ stuff involving ρ , θ and ϕ and so forth.

3. Let \mathcal{E} be the sphere $\{(x, y, z) \mid x^2 + y^2 + z^2 \leq 9\}$ of radius 3. Write the integral

$$\iiint_{\mathcal{E}} x^2 + y^2 \, dV$$

in terms of spherical polar coordinates (ρ, θ, ϕ) . Simplify the integrand to the extent possible, but do NOT compute the value of the integral.