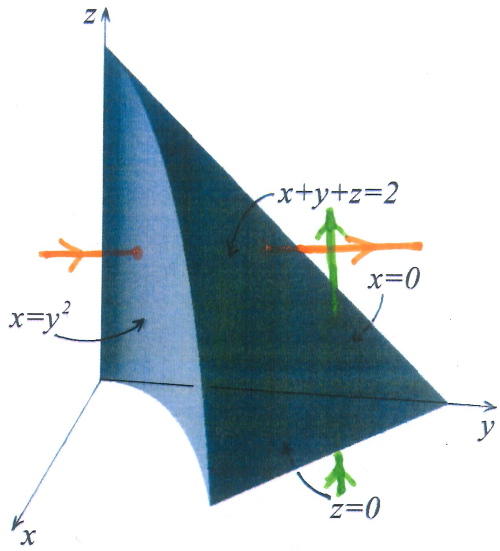
3. Let D be the region in space bounded by the parabolic cylinder $x = y^2$, the plane $x + y + z = 2$, the yz-plane, and the xy-plane.



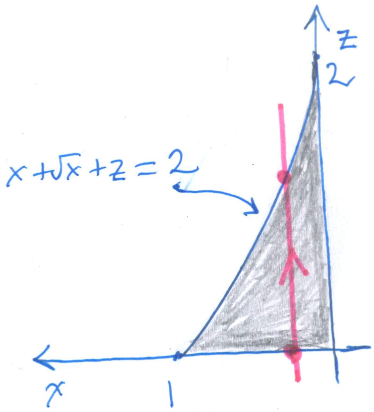
- Choose two of the following rectangular boxes by putting a ✗ in the ☐ in front of them, and then
- choose one of the orders of integration in each of the selected boxes by putting a ✗ in the ☐ in front of them.

☐	☐ $dx\,dy\,dz$	☐ $dx\,dz\,dy$
☒	☐ $dy\,dx\,dz$	☒ $dy\,dz\,dx$
☒	☐ $dz\,dx\,dy$	☒ $dz\,dy\,dx$

Express the volume V of the region D in terms of iterated integrals in each of your selected orders of integration **(a)** and **(b)**.

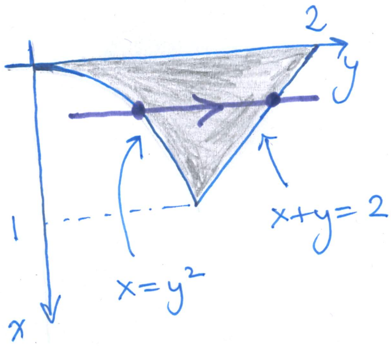
a.

$$V = \int_0^1 \int_0^{2-x-\sqrt{x}} \int_{\sqrt{x}}^{2-x-z} dy\, dz\, dx$$



b.

$$V = \int_0^1 \int_{\sqrt{x}}^{2-x} \int_0^{2-x-y} dz\, dy\, dx$$



c. Find the volume V.

$$V = \int_0^1 \int_0^{2-x-\sqrt{x}} (2-x-z-\sqrt{x})\, dz\, dx = \int_0^1 \Big[(2-x-\sqrt{x})z - \tfrac{1}{2}z^2\Big]_{z=0}^{z=2-x-\sqrt{x}} dx$$

$$= \int_0^1 \frac{1}{2}(2-x-\sqrt{x})^2\, dx = \int_0^1 \left(2 + \tfrac{1}{2}x^2 + \tfrac{1}{2}x - 2x - 2\sqrt{x} + x^{3/2}\right) dx$$

$$= 2 + \frac{1}{6} + \frac{1}{4} - 1 - \frac{4}{3} + \frac{2}{5} = \frac{29}{60}$$