Triple integral done as an \( x \)-simple region

In class we spent quite a bit of time discussing the following example.

**Example.** Evaluate

\[
\iiint_Q z \, dV
\]

where \( Q \) is the region bounded by the cylinder \( x^2 + z^2 = 9 \), the plane \( y + z = 3 \), and the plane \( y = 0 \).

When we treated the region as \( y \)-simple, we obtained the integral

\[
\int_{-3}^{3} \int_{-\sqrt{9-x^2}}^{\sqrt{9-x^2}} \int_{0}^{3-z} z \, dy \, dz \, dx = -\frac{81}{4} \pi.
\]

Since the region is also \( x \)-simple, this integral can also be expressed as

\[
\int_{0}^{6} \int_{-3}^{3-y} \int_{-\sqrt{9-z^2}}^{\sqrt{9-z^2}} z \, dx \, dz \, dy.
\]