\[
\frac{x^2}{4^2} + \frac{(y-1)^2}{3^2} - (z+2)^2 = 1
\]

What is the trace at \( x = 3 \)

\[
\frac{3^2}{4^2} + \frac{(y-1)^2}{3^2} - (z+2)^2 = 1
\]

\[
\frac{(y-1)^2}{3^2} - (z+2)^2 = 1 - \frac{9}{16}
\]

\[
\frac{(y-1)^2}{3^2 \cdot \sqrt{\frac{9}{16}}} - \frac{(z+2)^2}{\sqrt{\frac{9}{16}}} = 1
\]
if \ x = k

\[ \frac{k^2}{y^2} + \frac{(y-1)^2}{3^2} + (z+2)^2 = 1 \]
eg. what is the surface determined by all points $P$ such that the distance from $P$ to the $x$-axis is twice the distance from $P$ to the $y$-$z$ plane.
If \( P = (x, y, z) \)

The distance to the \( yz \) plane is \( |x| = \sqrt{x^2} \)

The distance to the \( x \)-axis is \( \sqrt{y^2 + z^2} \)

We want

\[
\sqrt{y^2 + z^2} = 2\sqrt{x^2}
\]

So

\[
y^2 + z^2 = 4x^2
\]

\[
y^2 \quad + \quad z^2 = x^2
\]

\[
\frac{y^2}{2^2} + \frac{z^2}{2^2} = x^2
\]
\((-1, 0, 0)\) and \(x = 1\)

\[P = (x, y, z)\]

\[d_{\text{ist}}(P, (-1, 0, 0)) = d_{\text{ist}}(P, \text{plane } x = 1)\]

\[\sqrt{(x-1)^2 + y^2 + z^2} = \sqrt{(x-1)^2}\]

\[(x+1)^2 + y^2 + z^2 = (x-1)^2\]

\[x^2 + 2x + 1 + y^2 + z^2 = x^2 + 2x + 1\]

\[4x + y^2 + z^2 = 0\]

\[\frac{x}{-\frac{1}{4}} = y^2 + z^2\]