12.6, number 8: **Which picture from (a)–(l) corresponds to**

$$z^2 + x^2 - y^2 = 1?$$

Answer:

When $x = 0$, the equation describes an hyperbola in the yz-plane.

When $y = 0$, the equation describes a circle in the xz-plane.

When $z = 0$, the equation describes a hyperbola in the xy-plane.

The total graph is a hyperboloid of one sheet. The answer is either (i) or (j). Notice the intersection of (i) with the xz-plane is a hyperbola; but the intersection of (j) with the xz plane is an ellipse (or circle). The graph must be $\boxed{j}$.