

12.6, number 2: Which picture from (a)–(l) corresponds to

$$z^2 + 4y^2 - 4x^2 = 4?$$

**Answer:**

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

When  $y = 0$ , the equation describes a hyperbola 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  $yz$ -plane is an ellipse; but the intersection of (j) with the  $yz$  plane is an hyperbola. The graph must be i.