

12.6, number 1: Which picture from (a)–(l) corresponds to

$$x^2 + y^2 + 4z^2 = 10?$$

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

When  $y = 0$ , the equation describes an ellipse in the  $xz$ -plane.

When  $z = 0$ , the equation describes an ellipse in the  $xy$ -plane.

The total graph is an ellipsoid. So it is either (c) or (d). Now we look at a few of the points on the surface:  $(\sqrt{10}, 0, 0)$ ,  $(0, \sqrt{10}, 0)$ , and  $(0, 0, \sqrt{10}/4)$ . So the graph is shorter in the  $z$ -direction than it is in either the  $x$ -direction or the  $y$ -direction. The graph must be d.