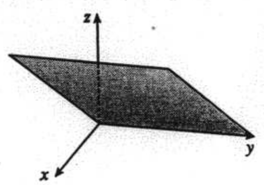
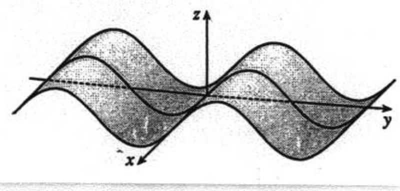
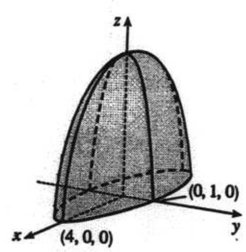
→ **10.** $z = x$, a plane which intersects the xz-plane in the line $z = x$, $y = 0$. The portion of this plane that lies in the first octant is shown.



→ **12.** $z = \sin y$, a "wave".



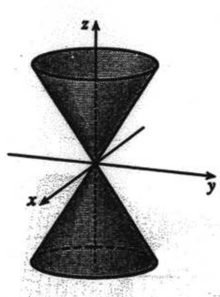
→ **16.** The equation of the graph is $z = \sqrt{16 - x^2 - 16y^2}$ or equivalently $x^2 + 16y^2 + z^2 = 16$, $z \geq 0$. Traces in $x = k$ are $16y^2 + z^2 = 16 - k^2$, $z \geq 0$, a family of ellipses where here we have only the upper halves. Traces in $y = k$ are $x^2 + z^2 = 16 - 16k^2$, $z \geq 0$, again a family of half-ellipses. Traces in $z = k$, $k \geq 0$, are another family of ellipses, $x^2 + 16y^2 = 16 - k^2$.



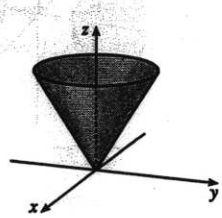
Note that the equation can be written as $\dfrac{x^2}{16} + y^2 + \dfrac{z^2}{16} = 1$, $z \geq 0$, which we recognize as the top half of an ellipsoid with intercepts ± 4, ± 1, and 4.

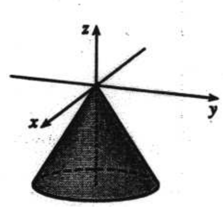
→ **24.** (a) The traces of $z^2 = x^2 + y^2$ in $x = k$ are $z^2 = y^2 + k^2$, a family of hyperbolas, as are traces in $y = k$, $z^2 = x^2 + k^2$. Traces in $z = k$ are $x^2 + y^2 = k^2$, a family of circles.

(b) The surface is a circular cone with axis the z-axis.



(c) The graph of $f(x, y) = \sqrt{x^2 + y^2}$ is the upper half of the cone in part (b), and the graph of $g(x, y) = -\sqrt{x^2 + y^2}$ is the lower half.





→ **32.** Any point on the curve of intersection must satisfy both $2x^2 + 4y^2 - 2z^2 + 6x = 2$ and $2x^2 + 4y^2 - 2z^2 - 5y = 0$. Subtracting, we get $6x + 5y = 2$, which is linear and therefore the equation of a plane. Thus the curve of intersection lies in this plane.