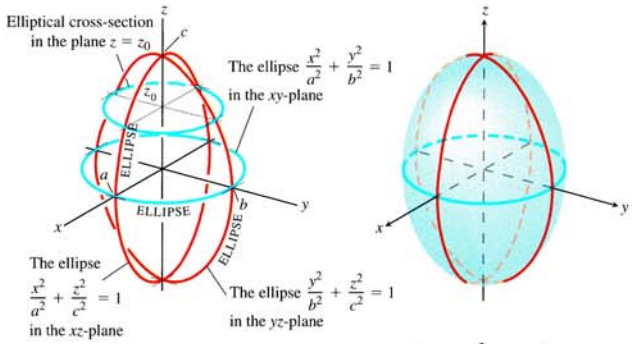
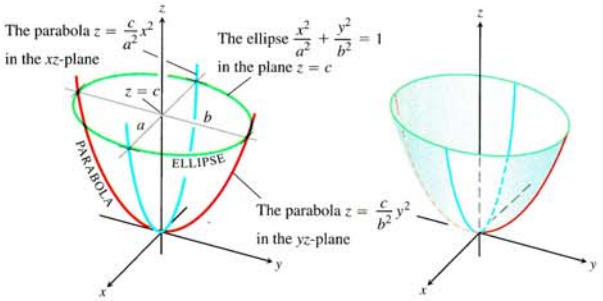
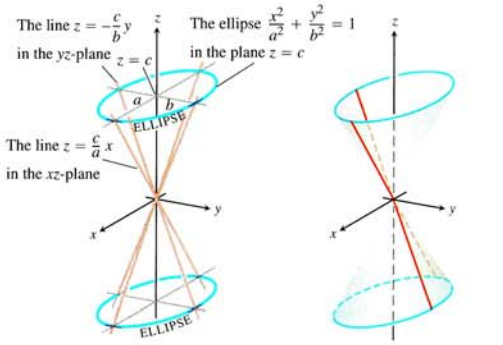
TABLE 12.1 Graphs of Quadric Surfaces



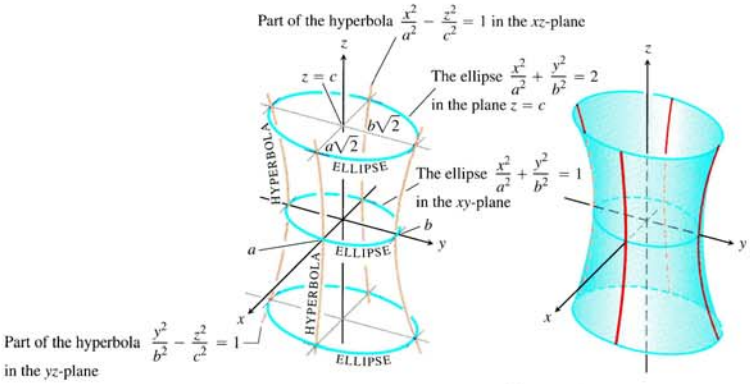
ELLIPSOID $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} + \dfrac{z^2}{c^2} = 1$



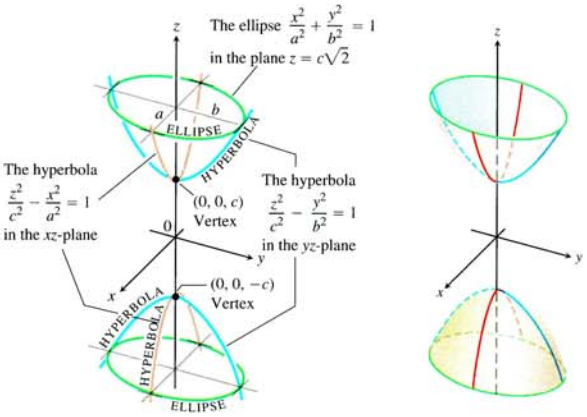
ELLIPTICAL PARABOLOID $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = \dfrac{z}{c}$



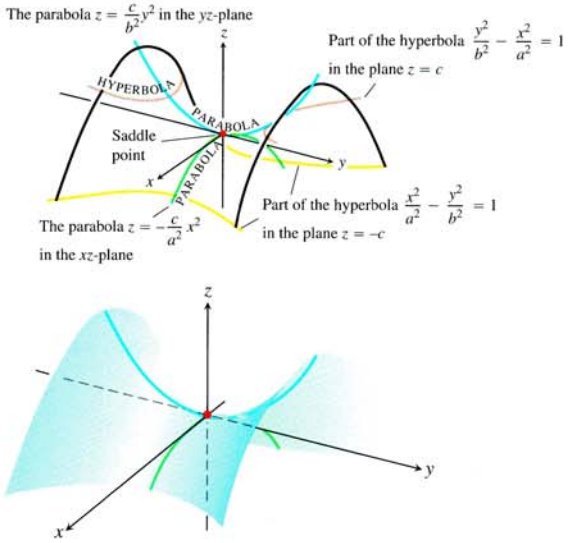
ELLIPTICAL CONE $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = \dfrac{z^2}{c^2}$



HYPERBOLOID OF ONE SHEET $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} - \dfrac{z^2}{c^2} = 1$



HYPERBOLOID OF TWO SHEETS $\dfrac{z^2}{c^2} - \dfrac{x^2}{a^2} - \dfrac{y^2}{b^2} = 1$

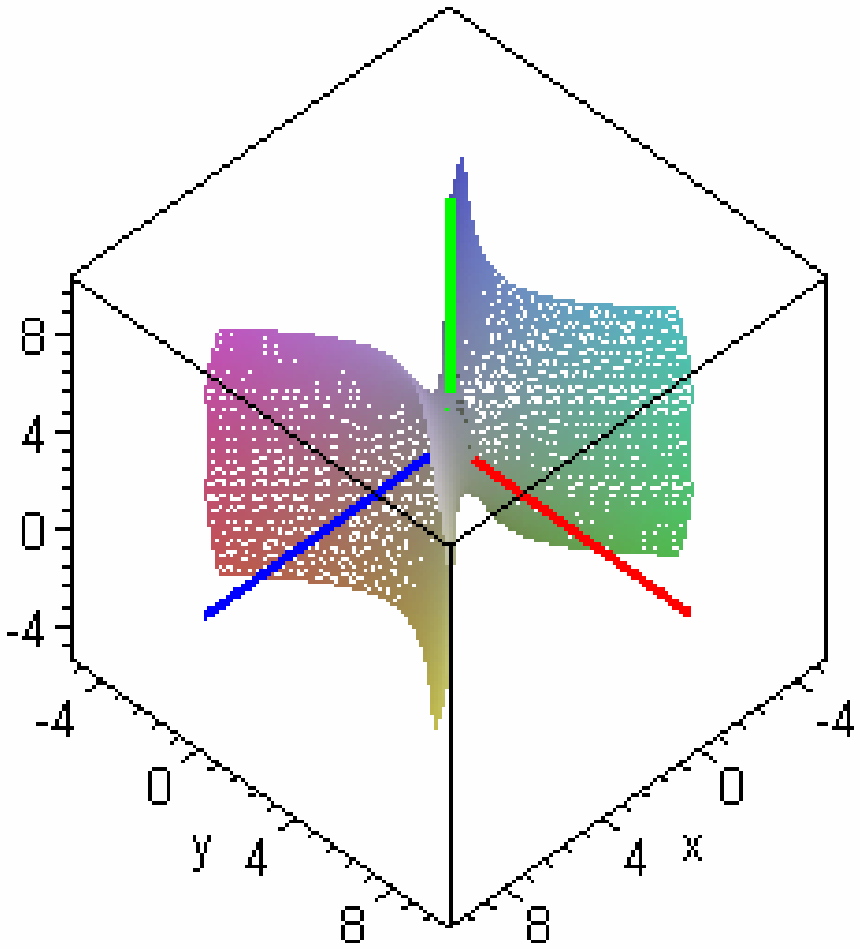


HYPERBOLIC PARABOLOID $\dfrac{y^2}{b^2} - \dfrac{x^2}{a^2} = \dfrac{z}{c}, c > 0$

All pictures given here are generated $-5 \le x \le 5 \quad -5 \le y \le 5 \quad -5 \le z \le 5$

To make the orientation clear: **blue line** is the positive x-axis,
red line is the positive y-axis, and **green line** is the positive z-axis

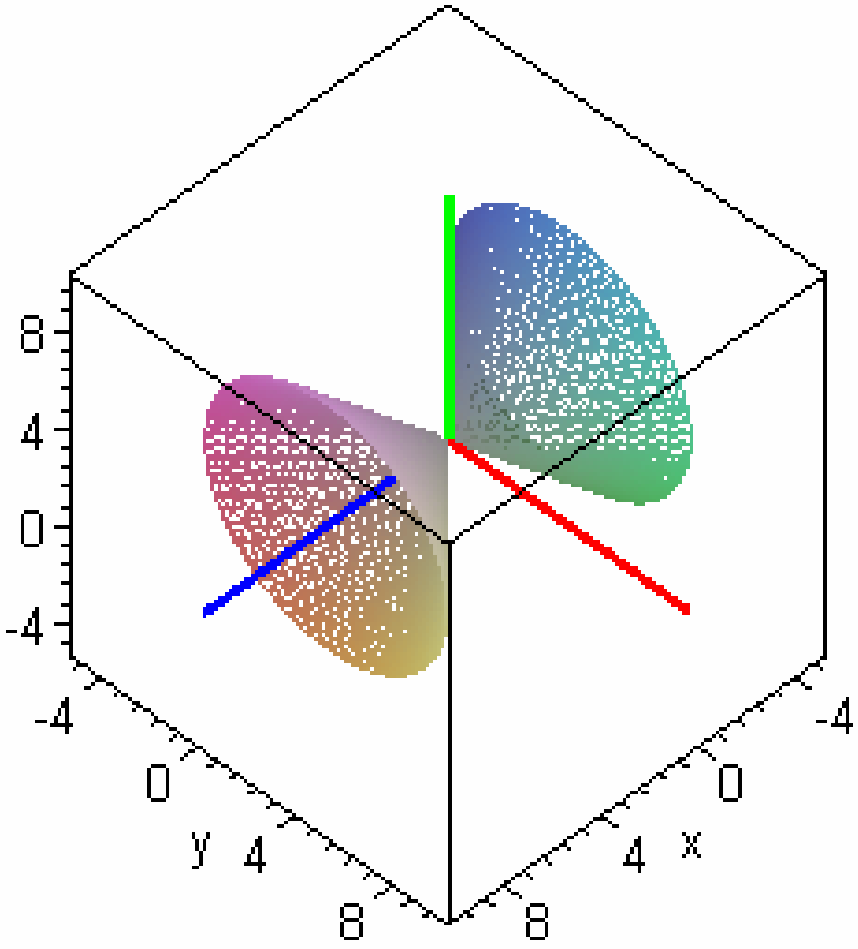
2) $z^2 + 4y^2 - 4x^2 = 4$



hyperboloid

picture f

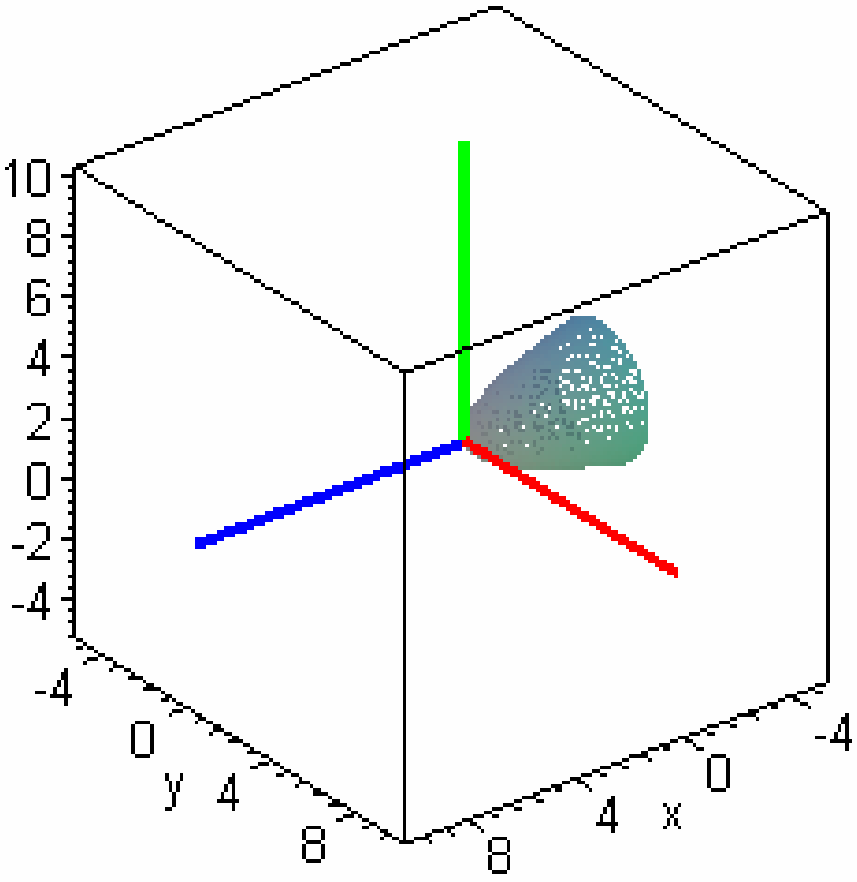
4) $y^2 + z^2 = x^2$



cone

picture g

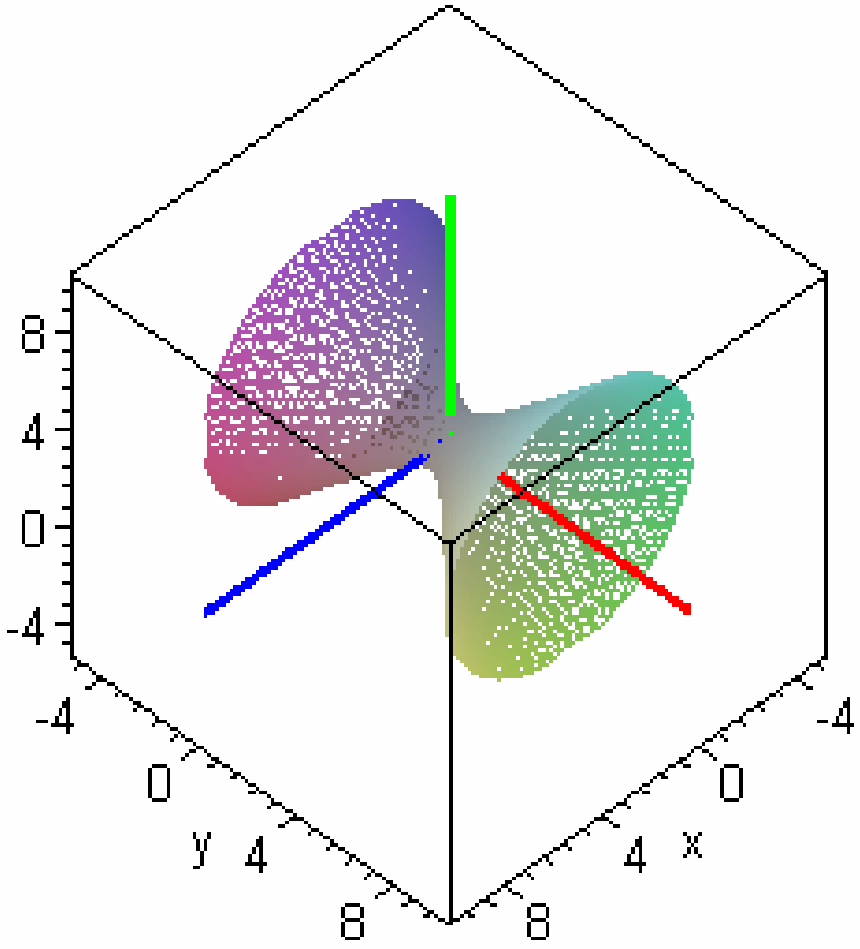
6) $x = -y^2 - z^2$



parabloloid

picture e [note: the figure in the text is incorrect]

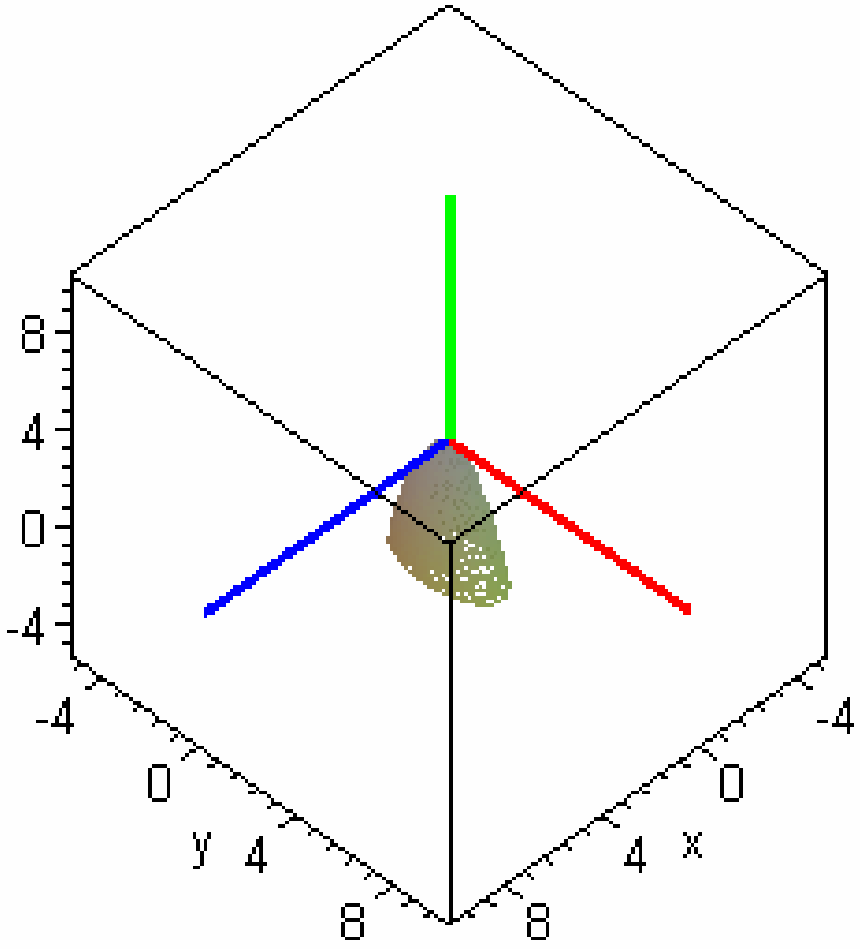
8) $z^2 + x^2 - y^2 = 1$



hyperboloid

picture j

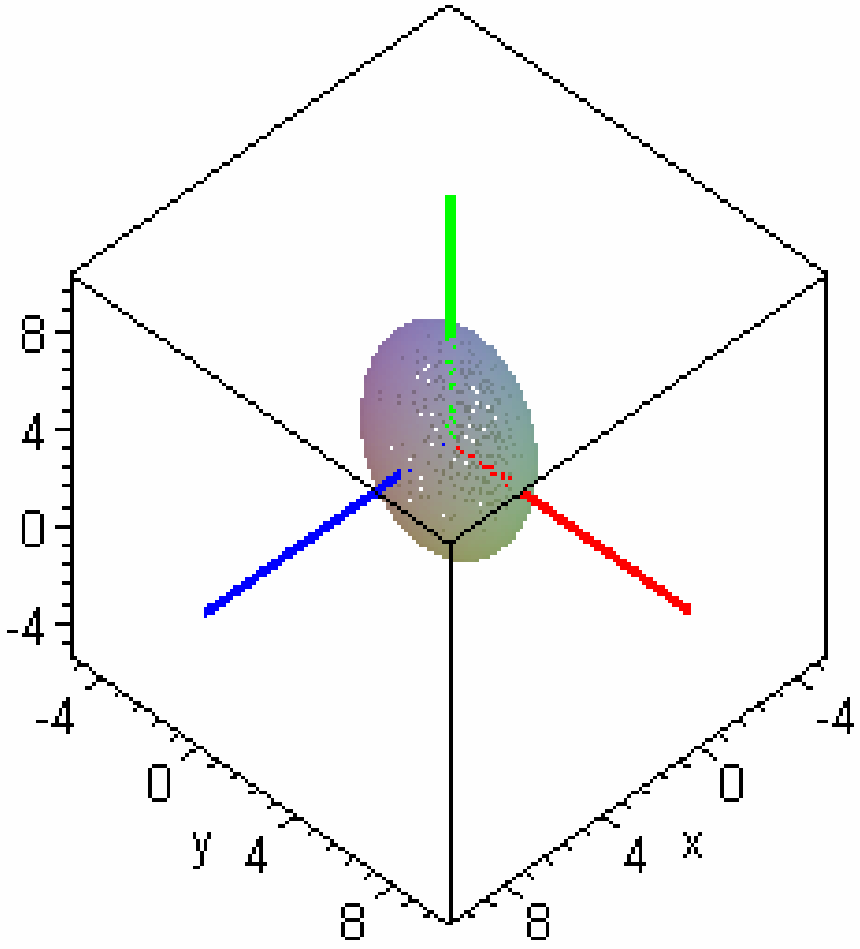
10) $z = -4x^2 - y^2$



paraboloid

picture f

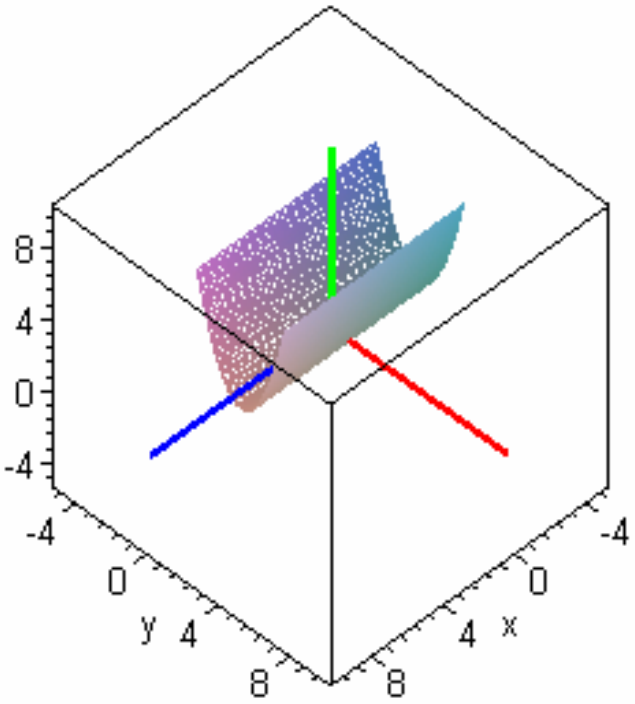
12) $9x^2 + 4y^2 + 2z^2 = 36$



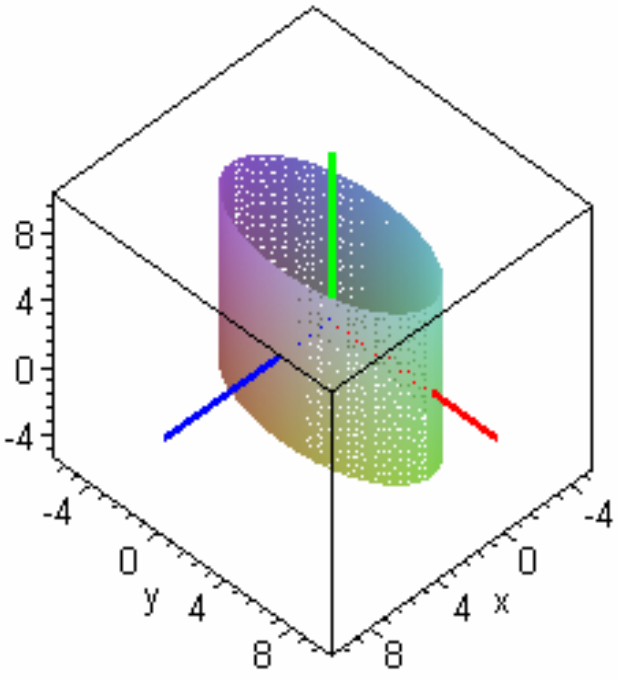
ellipsoid

picture c

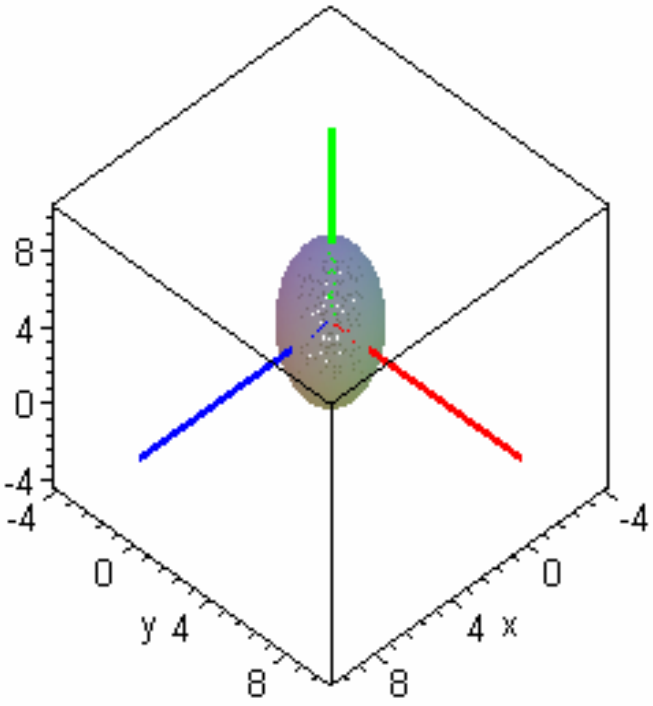
14) $z = y^2 - 1$



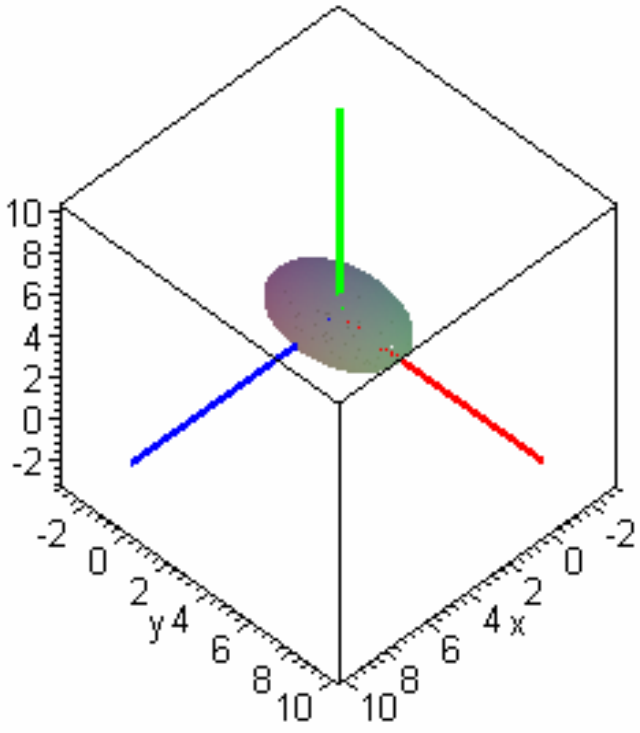
16) $4x^2 + y^2 = 36$



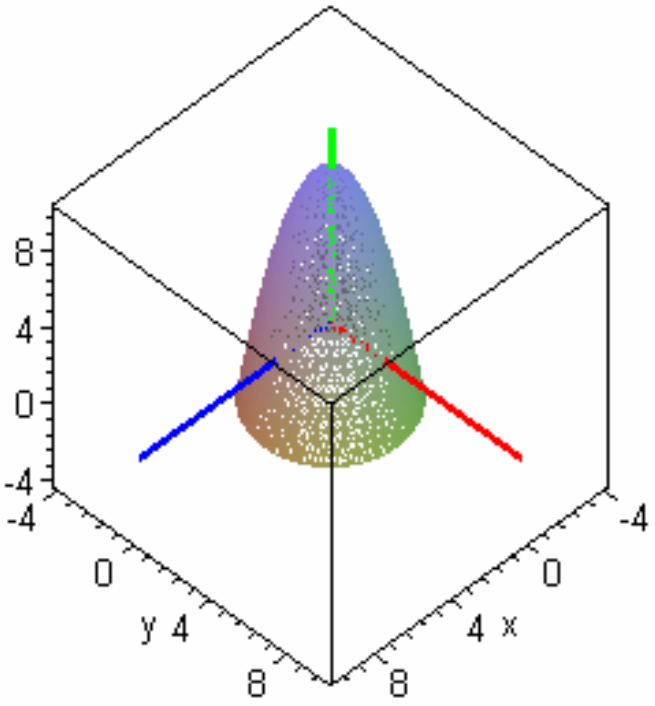
18) $4x^2 + 4y^2 + z^2 = 16$



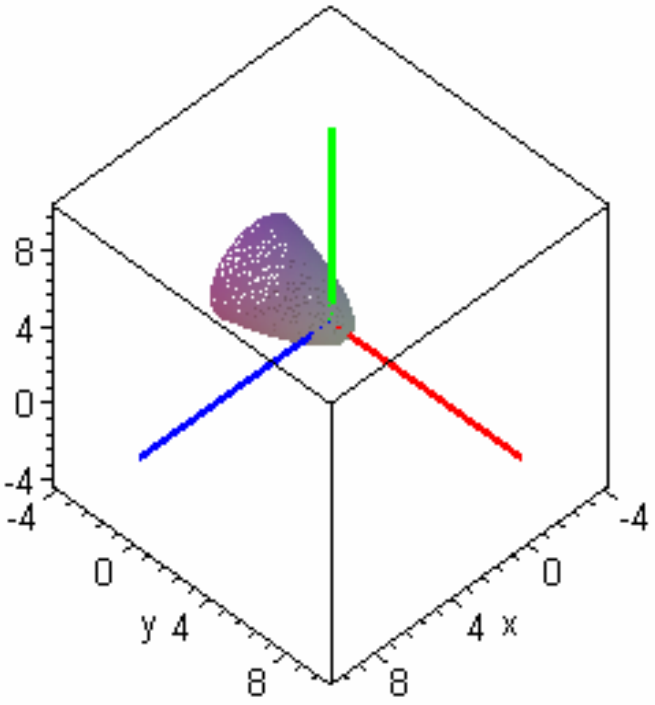
20) $9x^2 + 4y^2 + 36z^2 = 36$



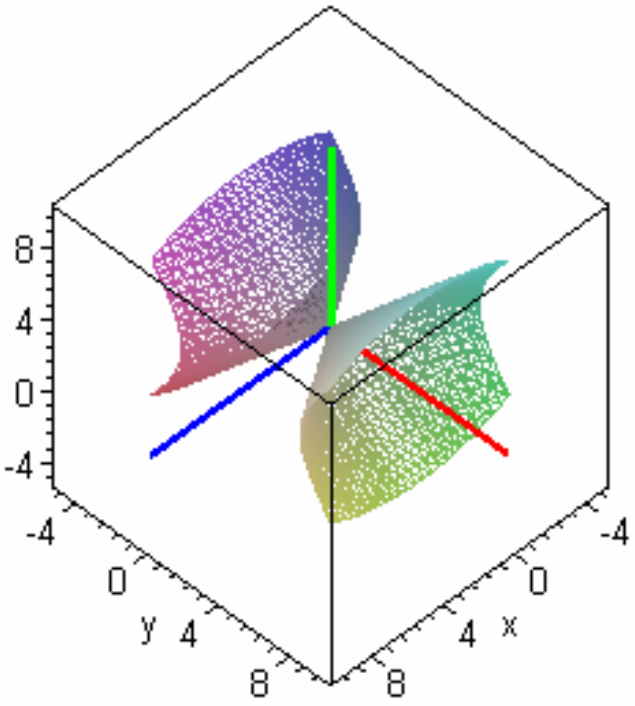
22) $z = 8 - x^2 - y^2$



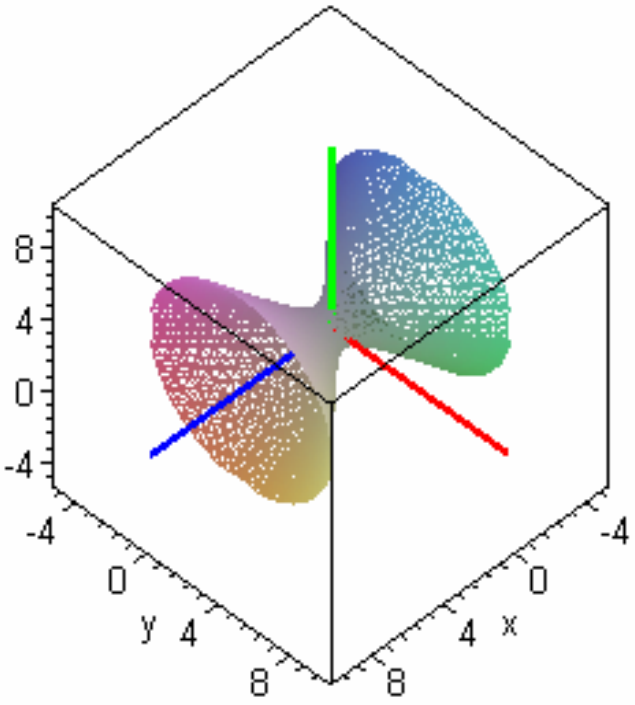
24) $y = 1 - x^2 - z^2$



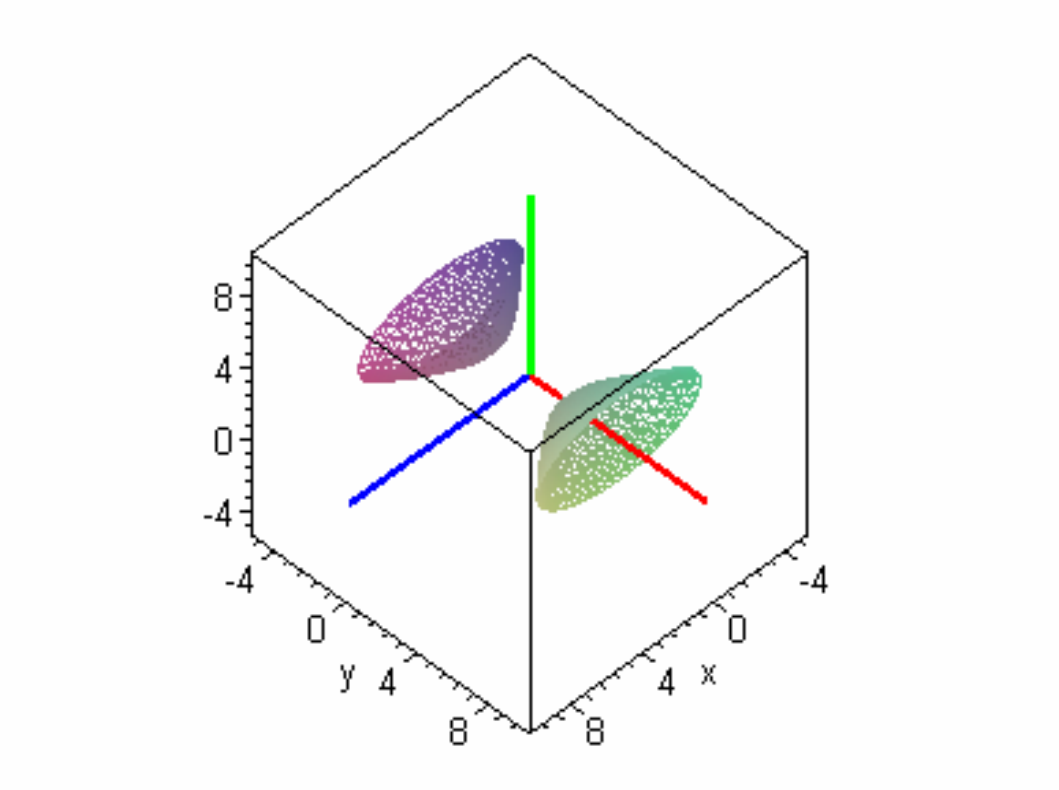
26) $4x^2 + 9z^2 = 9y^2$



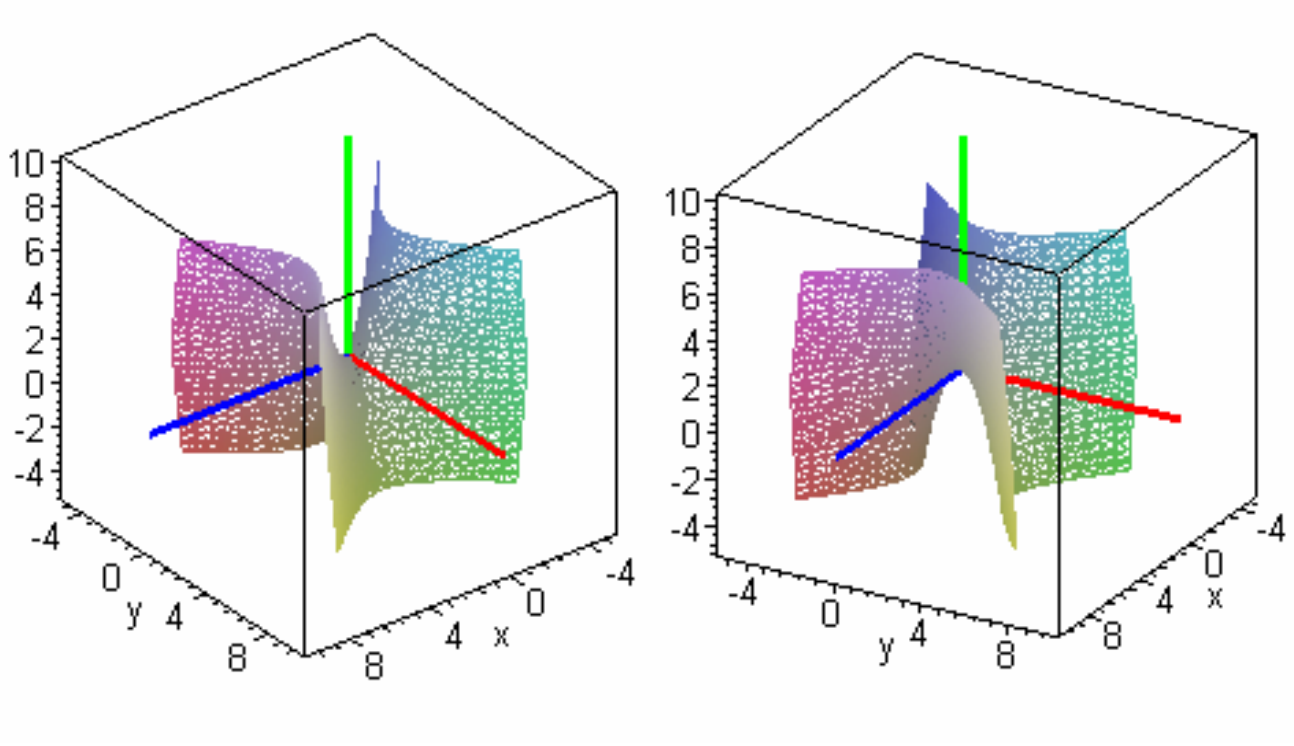
28) $y^2 + z^2 - x^2 = 1$



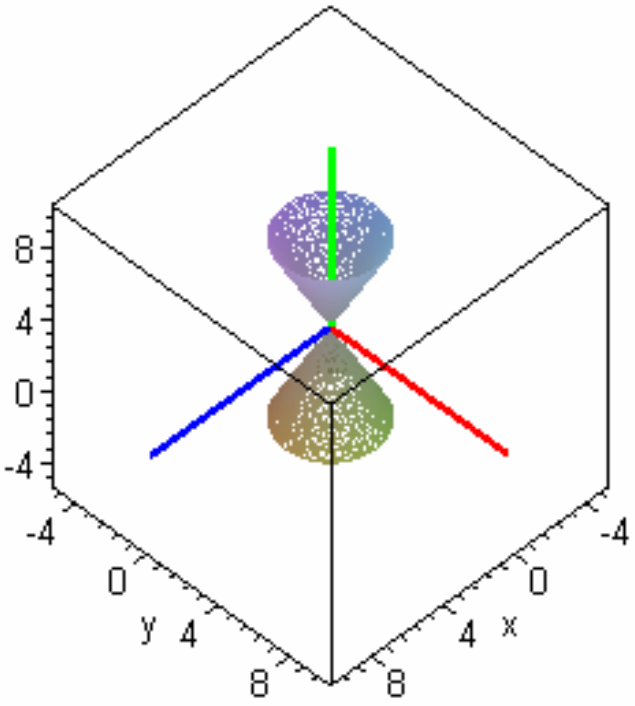
30) $\frac{y^4}{4} - \frac{x^2}{4} - z^2 = 1$



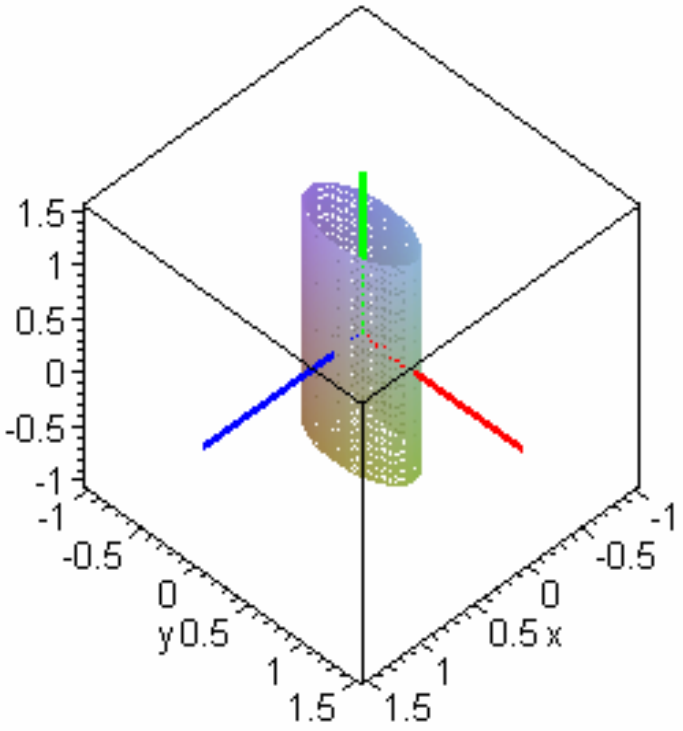
30) $x^2 - y^2 = z$



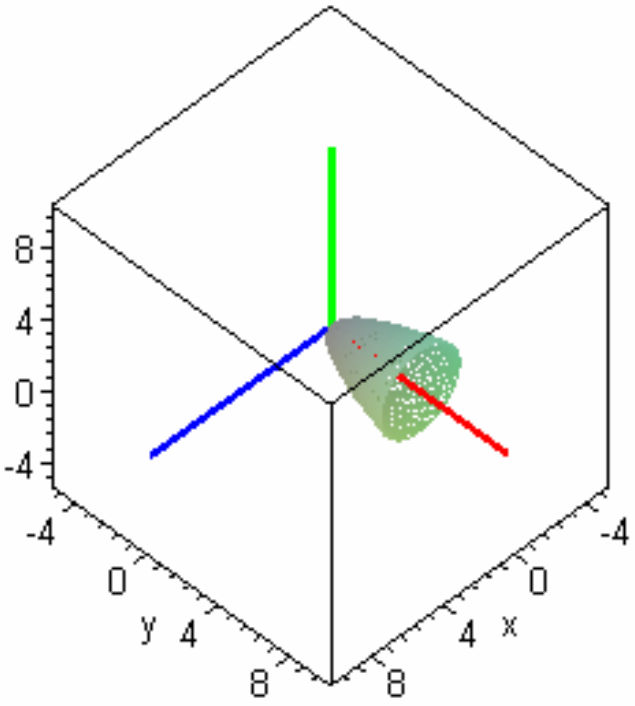
34) $4x^2 + 4y^2 = z^2$



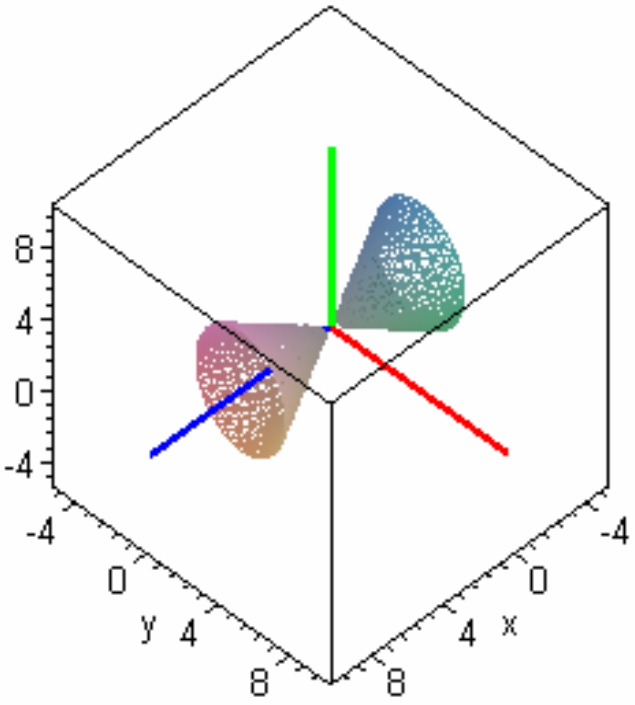
36) $16x^2 + 4y^2 = 1$



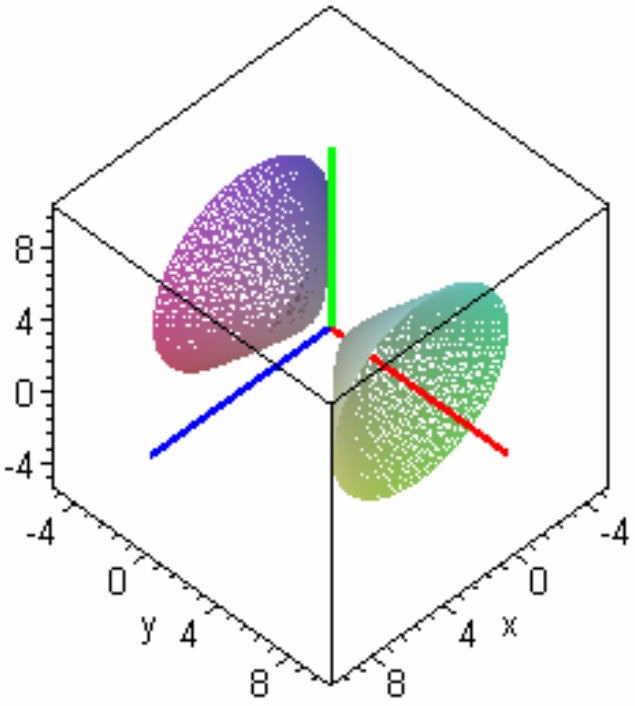
38) $x^2 + z^2 = y$



40) $16y^2 + 9z^2 = 4x^2$



42) $y^2 - x^2 - z^2 = 1$



44) $x^2 + y^2 = z$