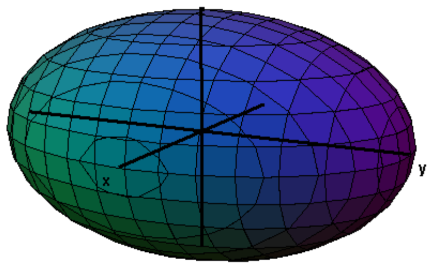
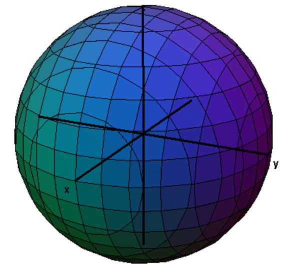


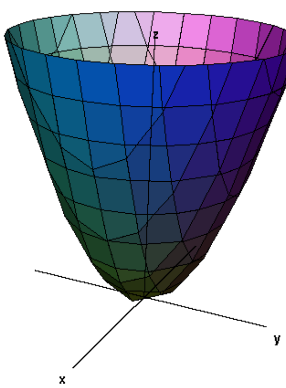
Ellipsoid: $\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$

- All traces are ellipses.
- If $a=b=c$, the ellipsoid is a sphere.



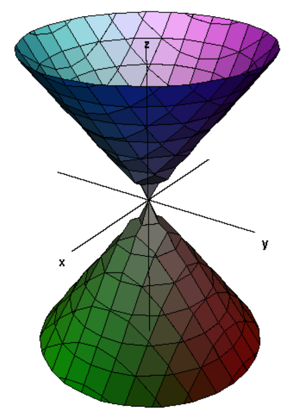
Sphere: $x^2+y^2+z^2=r^2$

- All Traces are circles.



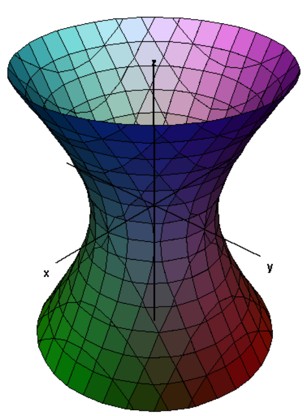
Elliptic Paraboloid: $\frac{z}{c}=\frac{x^2}{a^2}+\frac{y^2}{b^2}$

- Horizontal traces are ellipses.
- Vertical traces are parabolas.
- The variable raised to the first power indicates the axis of the paraboloid.



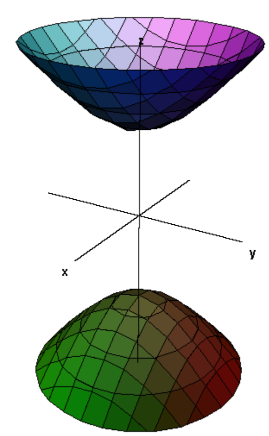
Cone: $\frac{z^2}{c^2}=\frac{x^2}{a^2}+\frac{y^2}{b^2}$

- Horizontal traces are ellipses.
- Vertical traces in the planes $x=k$ and $y=k$ are hyperbolas if $k\neq 0$ but are pairs of lines if $k=0$



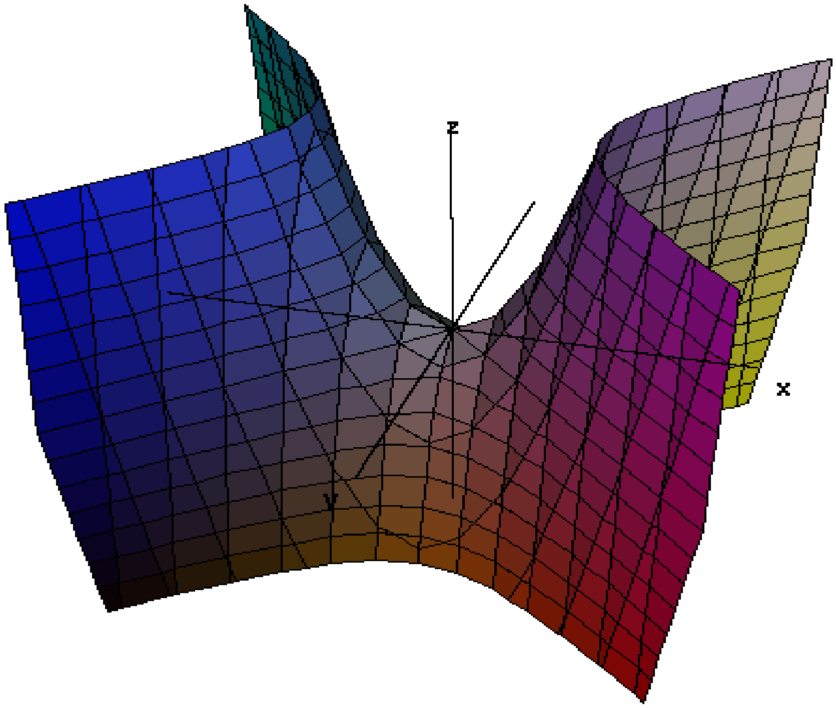
Hyperboloid of One Sheet: $\frac{x^2}{a^2}+\frac{y^2}{b^2}-\frac{z^2}{c^2}=1$

- Horizontal traces are ellipses.
- Vertical traces are hyperbolas.
- The axis of symmetry corresponds to the variable whose coefficient is negative.



Hyperboloid of Two Sheets: $-\frac{x^2}{a^2}-\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$

- Horizontal traces in $z=k$ are ellipses if $k>c$ or $k<-c$.
- Vertical traces are hyperbolas.
- The two minus signs indicates two sheets.



Hyperbolic Paraboloid: $\frac{z}{c}=\frac{x^2}{a^2}-\frac{y^2}{b^2}$

- Horizontal traces are hyperbolas.
- Vertical traces are parabolas.
- The case where $c>0$ is illustrated.