

# Quadric Surfaces

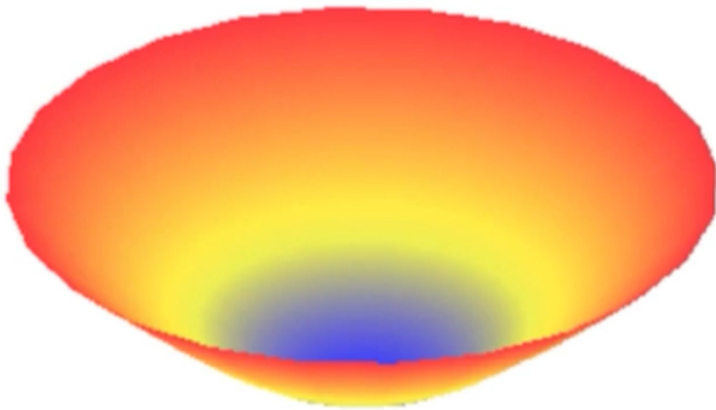
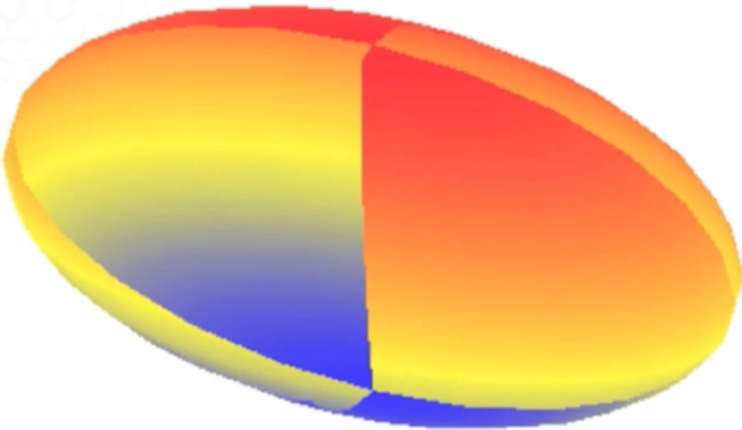

Cylinder -- A surface that is generated by moving a straight line along a given planar curve while holding the line parallel to a given fixed line. The curve used is called the generating curve.


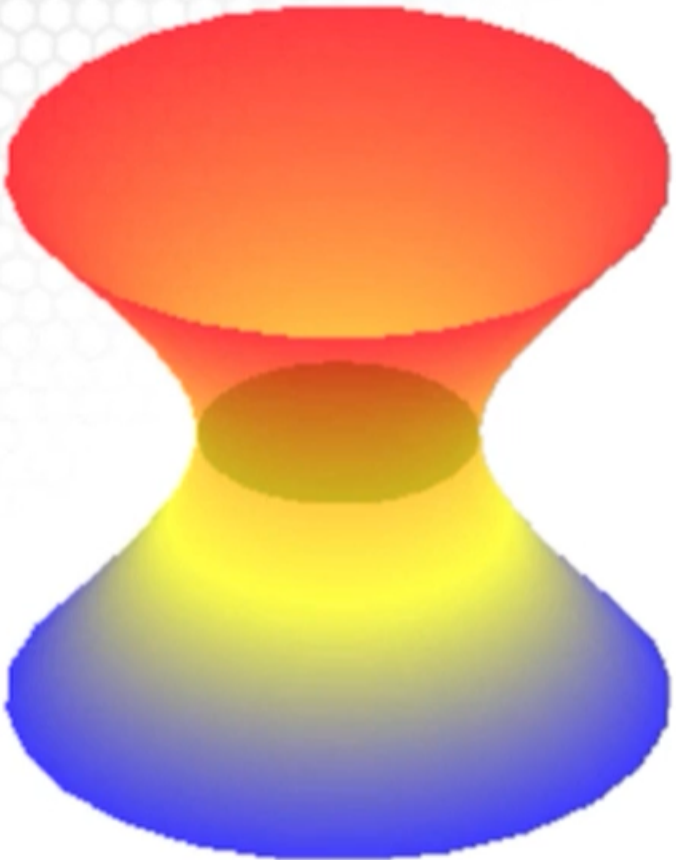



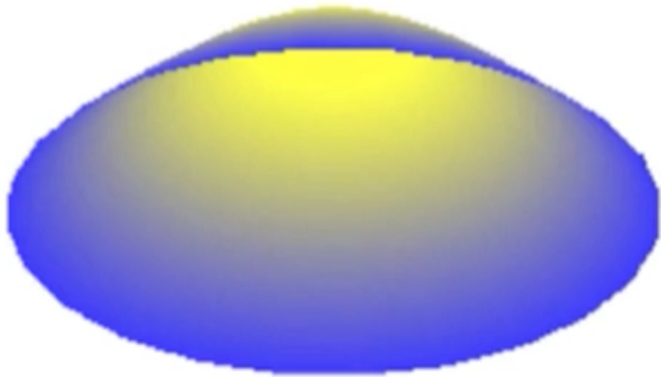
## Definition: Quadric Surface

A **quadric surface** is the graph in space of a second-degree equation in  $x$ ,  $y$ , and  $z$ . They can be expressed in the form

$$Ax^2 + By^2 + Cz^2 + Dxy + Exz + Fyz + Gx + Hy + Jz + K = 0$$

Shape	Formula	Image
Elliptical Paraboloid	$\frac{x^2}{a^2} + \frac{y^2}{b^2} = \frac{z}{c}$	
Ellipsoid	$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$	
Elliptical Cone	$\frac{x^2}{a^2} + \frac{y^2}{b^2} = \frac{z^2}{c^2}$	

Shape	Formula	Image
		
Hyperboloid of One Sheet	$\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1$	
Hyperboloid of Two Sheets	$\frac{z^2}{c^2} - \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$	

Shape	Formula	Image
		
Hyperbolic Paraboloid	$\frac{y^2}{b^2} - \frac{x^2}{a^2} = \frac{z}{c}, c > 0$	