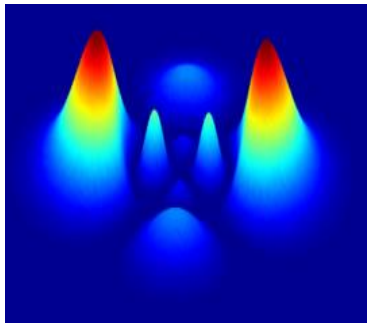


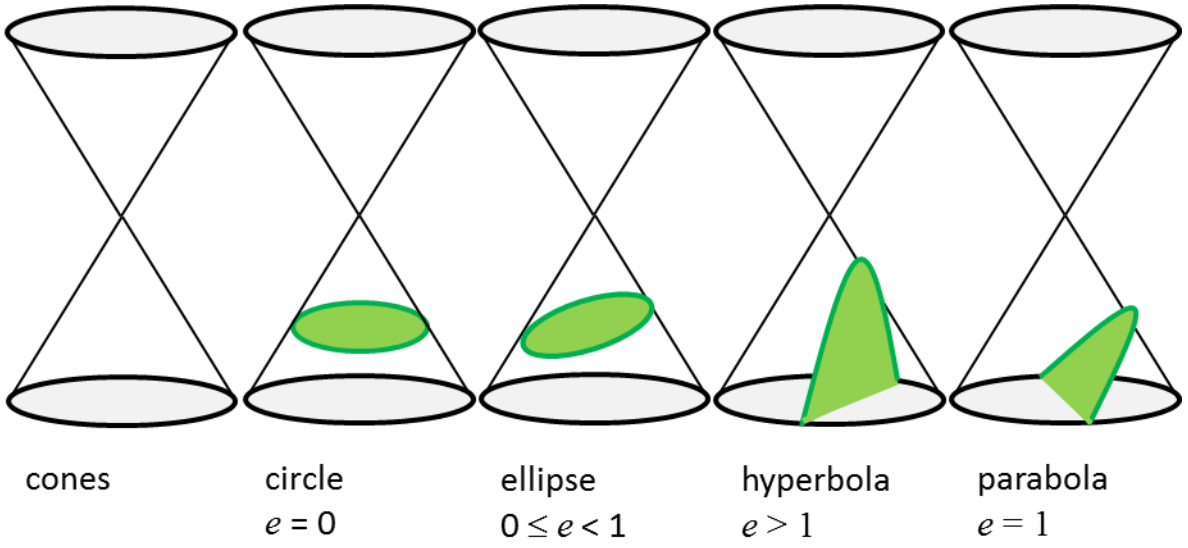
MATHEMATICS EXTENSION 2

4 UNIT MATHEMATICS

TOPIC 3: CONICS

3.5 CONIC SECTIONS

Taking different slices through a cone you can create a circle, an ellipse, a parabola and a hyperbola.



Theses conic sections are defined using a straight line (**directrix** $y=-a$) and a point (**focus** $F(0,a)$) where a is the conic section parameter.

Consider any point $P(x_P, y_P)$ on the conic section and the point $D(x_P, -a)$ on the directrix. The distances of these two points from the focus $F(0,a)$ are d_{FP} and d_{DP}.

The ratio d_{FP}/d_{DP} is called the **eccentricity** e and is a constant for all conic sections

eccentricity $e = d_{FP}/d_{DP}$

Ellipse $0 \le e < 1$

Hyperbola $e > 1$

Parabola $e = 1$