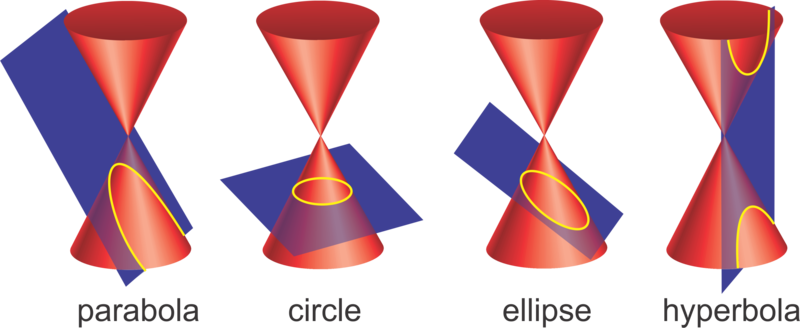
**2A Parametrics Revisited**



1. A curve has parametic equations

where is a positive constant. Find the Cartesian equation of the curve

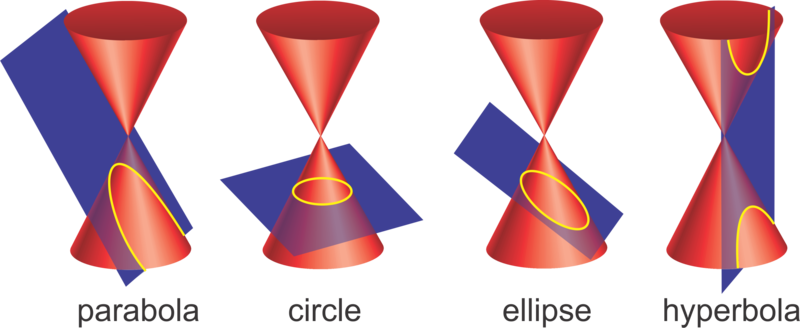
A curve has parametric equations

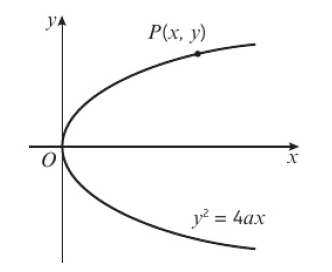
where is a positive constant.

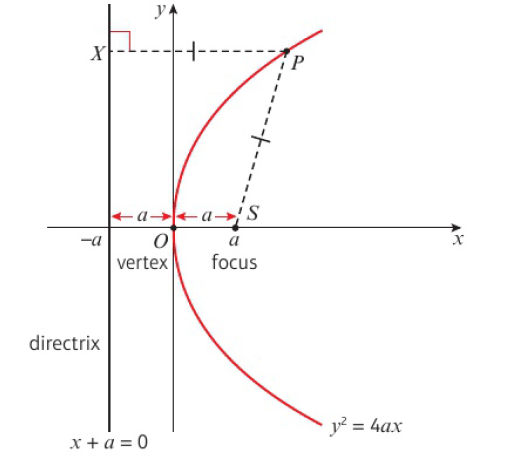
1. Find the Cartesian equation of the curve.
2. Hence sketch the curve

Note: Alternative approach (multiplying to cancel t)

**2B Parabolas**







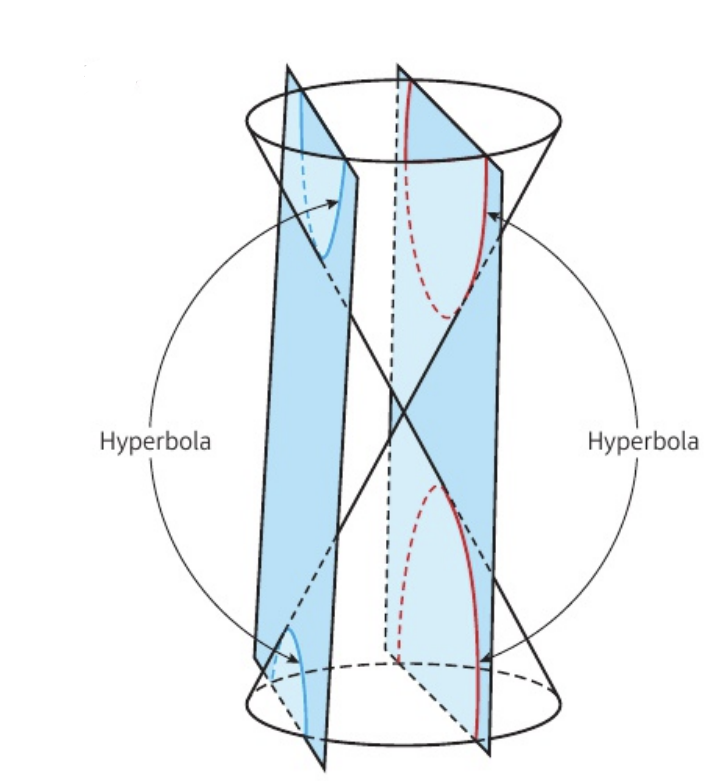
1. Find the equation of the parabola with:
2. focus: and directrix
3. focus and directrix
4. Find the coordinates of the focus and an equation of the directrix of a parabola with equation:

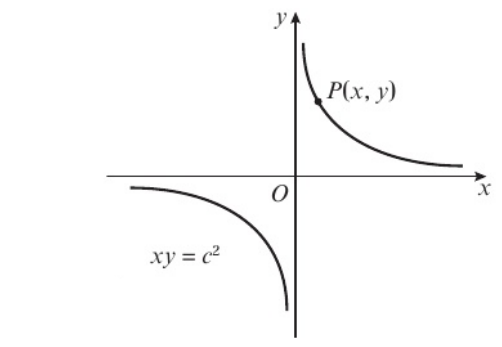
**2C Parabolas & Chords**

1. A point lies on the parabola C with equation . The point is the focus of the parabola. The line l passes through S and P.
2. Find the coordinates of .
3. Find an equation for , giving your answers in the form , where , , are integers.
4. The line meets the parabola again at the point . The point is the mid-point of . Find the coordinates of .
5. Find the coordinates of .
6. Draw a sketch showing parabola , the line   
   and the points , , and .
7. The parabola has general point . The line intersects at the points and . Find, in terms of and , the length of the chord .

A quick note on integration:

**2D Rectangular Hyperbolas**





Eccentricity

What makes it rectangular?

1. The rectangular hyperbola has Cartesian equation . The line with equation intersects the curve at the points and .
2. Find the coordinates of and .
3. Find the equation of the perpendicular bisector of in the form .

**2E Tangents & Normals**

1. The point , where , lies on the rectangular hyperbola with equation . Find:
2. The equation of the tangent .
3. The equation of the normal to at the point , giving your answer in the form .
4. The distinct points A and B, where lie on the parabola C with equation .
5. The line is the tangent to C at A and the line is the tangent to C at B.

Given that at A, , find the coordinates of A and B.

1. Draw a sketch showing the parabola C. Indicate A, B, and .
2. Find equations for and , giving your answer in the form .
3. The point with coordinates lies on the parabola with equation .

Find the equation of the tangent to at , giving your answer in the form

1. The point lies on the parabola with equation . Find:
2. The value of
3. An equation of the normal to at

The normal to at cuts the parabola again at the point . Find:

1. The coordinates of
2. The length , giving your answer as a simplified surd

**2F Problem Solving with Tangents & Normals**

1. The point lies on the parabola with equation where is a positive constant. Show that an equation of the normal to at is
2. The point lies on the rectangular hyperbola with equation where is a positive constant.
3. Show that an equation of the tangent to at is

A rectangular hyperbola has equation . The tangent to at the point and the tangent to at the point meet at the point

1. Find the coordinates of and .
2. The parabola has equation . The point is a general point on . The line is normal to at the point .
3. Show that an equation for is

The point lies on . The normal to at passes through the point as shown on the diagram. The region is bounded by this line, the curve and the -axis.

1. Given that lies in the first quadrant, show that the area of the shaded region is

**2G Loci**

1. The curve is the locus of points that are equidistant from the line with equation and the point . Prove that has Cartesian equation stating the value of .
2. The point lies on a parabola with equation . Show that the locus of the midpoints of is a parabola.