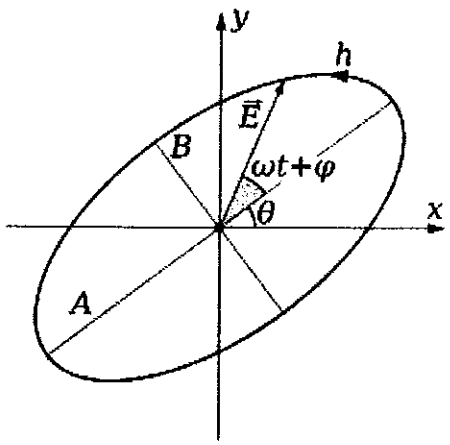
The Ellipse

http://www.brightstorm.com/math/algebra-2/conic-sections/the-ellipse/#



1. **Pre-listening. What are plural forms of these nouns?**
   Focus .....
   Axis .....
   Radius .....
   Vertex.....
   Locus .....
   Directrix .....

2. **Listen to the recording and answer questions.**

   a) Which synonym can replace the term „ellipse"?
   b) How is the concept of being equidistant different for a circle and for an ellipse?
   c) Which tools does the speaker use to draw an ellipse?
   d) Which two different arrangements of an ellipse does he mention?
   e) What is the difference between the major and minor axis?
   f) Where can vertices of an ellipse be found?
   g) Where are the co-vertices?
   h) What does x and y radius denote?
   i) How are the equations for horizontal and vertical ellipses different?
   j) What does a letter b denote?
   k) What are the foci of an ellipse?
   l) How is the formula different from the Pythagorean Theorem?

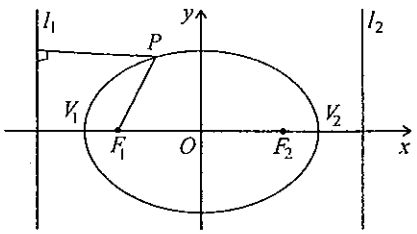
CONICS (CONIC SECTIONS)

The conic sections are curves obtained by the intersection of a right circular cone and a plane. According to the angle of intersection the conic is an ellipse, a parabola and a hyperbola. A circle is also a conic, it is a special case of an ellipse.

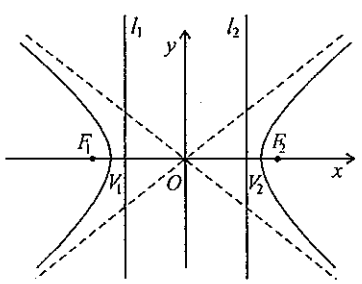
1. Look and read:

a) This is an *ellipse.* It is a closed curve which is symmetrical about both its axes.

- Fixed points F_1 and F_2 are called *foci* (sg. *focus*) of an ellipse.
- The line through the foci is the *major axis.* Perpendicular to the major axis through the centre is the *minor axis.*
- The points where the axes cut the ellipse are the *vertices.*
- The midpoint of the vertices is the *centre* of the ellipse.

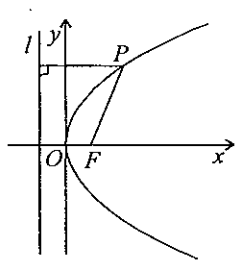


b) This is a *hyperbola.* It is a two-branched open curve.



- Fixed points F_1 and F_2 are called foci of a hyperbola.
- The line through the F_1 and F_2 is the *transverse axis* and the line through the centre perpendicular to the transverse axis is the *conjugate axis.*
- The points the transverse axis cuts the hyperbola are the *vertices.*
- The midpoint of the vertices is the *centre* of the hyperbola.
- The two separate parts of the hyperbola are the two *branches.*

c) This is a *parabola.* It is an open curve. It is the path (*locus*) of a point that moves in a plane so as to be equidistant from a fixed line and a fixed point.



- A fixed line is called the *directrix* (pl. *directrices*).
- A fixed point is the *focus.*
- A line through the focus perpendicular to the directrix is the *axis* of the parabola.
- The point where the axis cuts the parabola is the *vertex.* It is possible to take the vertex as origin.

2. Say whether the following statements are true or false:

a) An ellipse is an open curve.
b) A transverse axis is a straight line through the foci.
c) Fixed points are called the vertices.
d) A circle is a special case of a group of curves known as conic sections.
e) A parabola has two foci.
f) A parabola is a two-branched open curve.

3. Fill in the gaps:

a) A horizontal line through the centre of an ellipse is called .....
b) A parabola has a fixed point – ....., and a fixed line – .....
c) Two separate parts of a hyperbola are called .....
d) In an ellipse, the line through the centre perpendicular to the major axis is .....
e) Hyperbola has two axis: a horizontal one is called ....., and a vertical one is called .....
f) Points where the major axis cuts the ellipse are .....

Křepinská, Hauptová, Bubeníková: Rozšiřující materiály, Matfyzpress 2006