

Paraboloid

Parabola

Hyperbola

8

Hyperboloid

Ellipse

Ellipse to Parabola Again

www.magicmathworks.org/geomlab8

A) Take a paper disk. Keep folding the circumference on to a point off-centre. The resulting envelope curve is an ellipse.

B) Take a paper sheet. Keep folding one edge on to some point. The resulting envelope curve is a parabola. *Bearing 7 in mind, you'll realise that what you were in fact folding was a disk of infinite size.*

C) Anticipating **14**, we can go further and take a point *outside* the circle of part **A** to produce a *hyperbola*. Use the prepared acetate. Keep folding the circumference of the circle onto the external point.

Hyperbolic paraboloid

Line pair

Sine curve

Tractrix

Exponential curve

Catenary

Catenoid

Helix

Helicoid

Plane

Polygon

Polyhedron

Tiling

Archimedean spiral

Equiangular spiral

Loxodrome

Line family

Circle

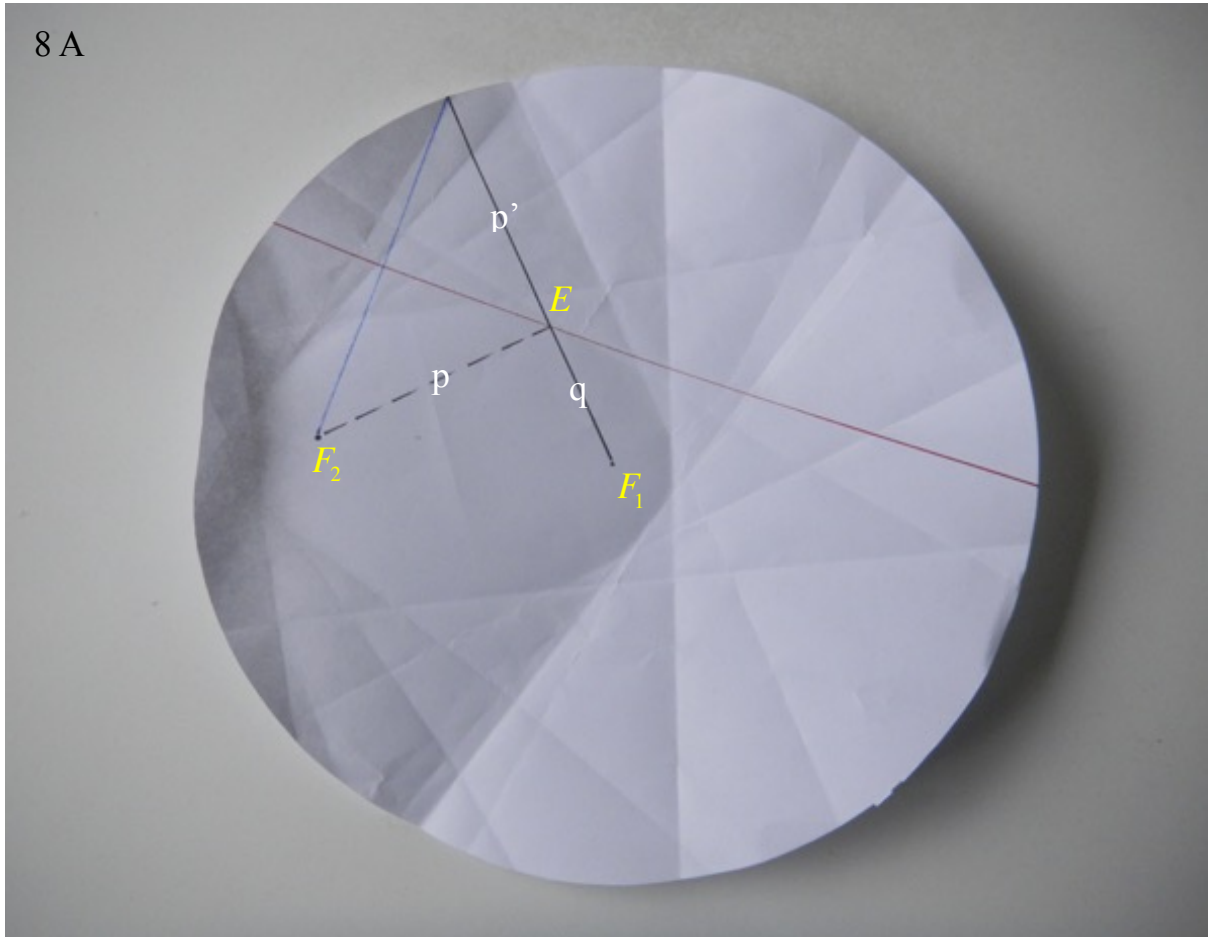
Cylinder

Cone

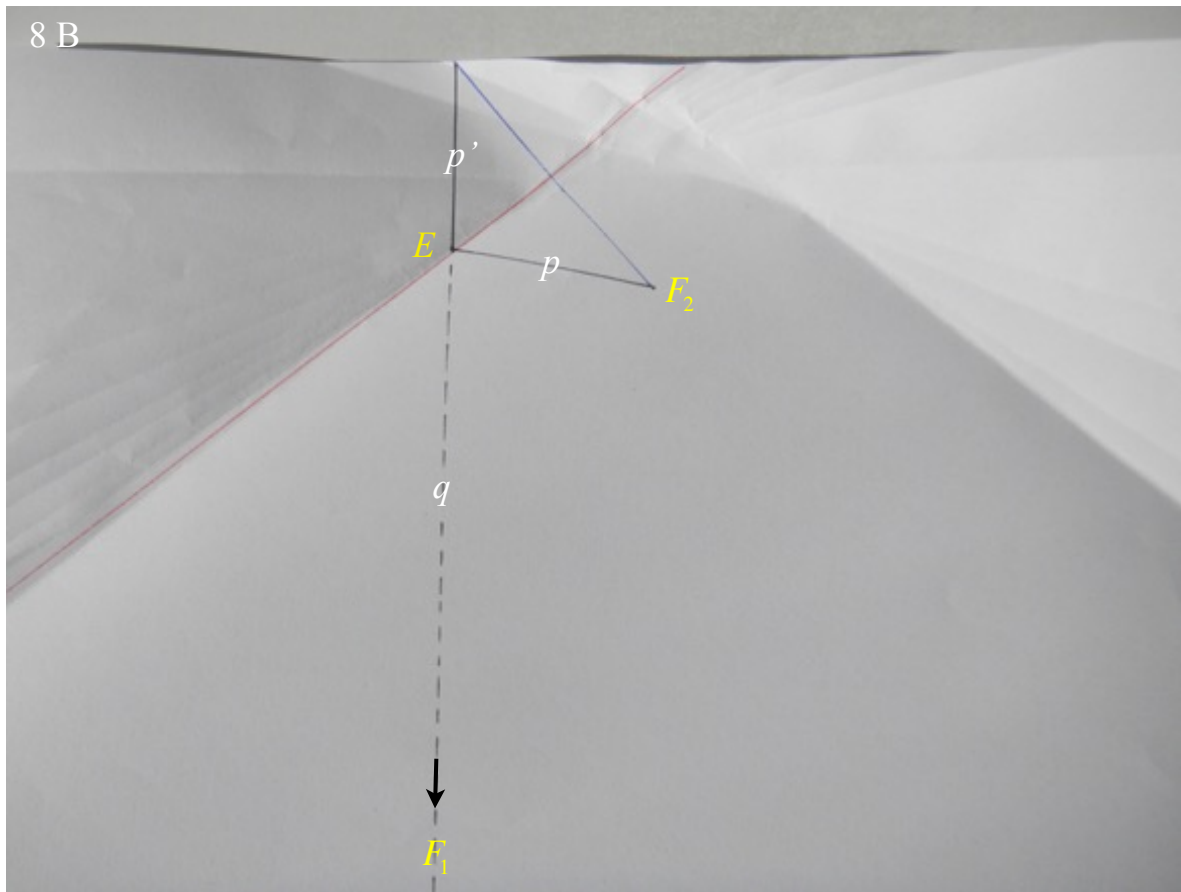
Sphere

Line

8 A



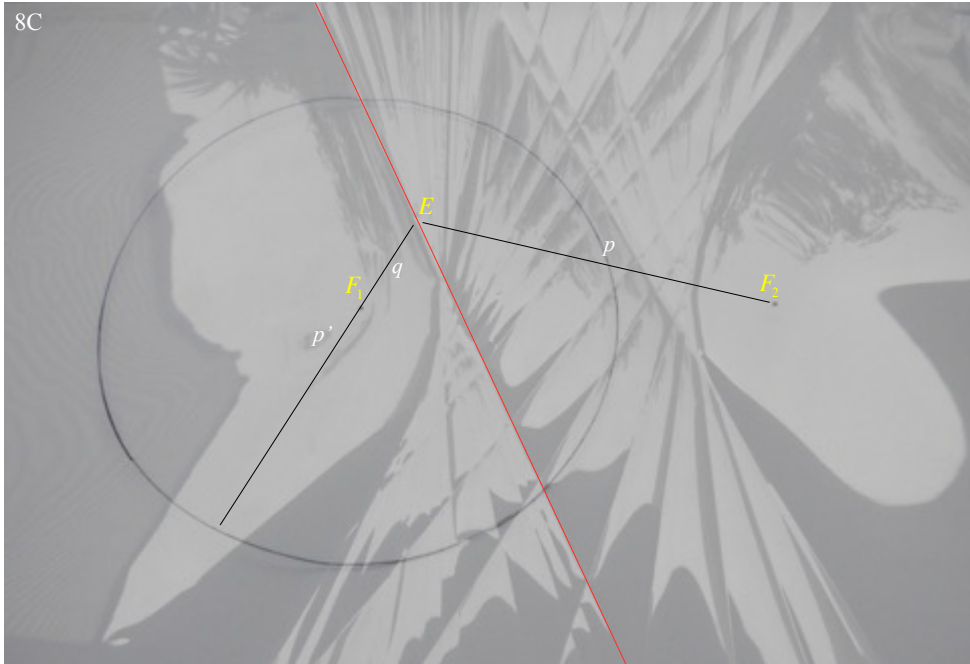
$p' + q$ is constant, the radius of the circle. $p = p'$, so $p + q$ is also constant. E is therefore a point on the ellipse of which F_1 and F_2 are foci.



$p = p'$. E is therefore a point on the parabola of which F_2 is the focus.

But we can also treat q as the distance to an infinitely remote focus, F_1 and argue as for **8 A**.

8C



$p' - q$ is constant, the radius of the circle. $p = p'$, so $p - q$ is also constant. E is therefore a point on the hyperbola of which F_1 and F_2 are foci.