PARABOLAS By ALGEBRA

CIRCLES, ELLIPSES, PARABOLAS, & HYPERBOLAS ARE THE FAMILY OF CURVES THAT RESULT FROM EQUATIONS WHERE the terms ARE to the 2ND power.

NOTE: LINES ARE THE ONLY MEMBER OF THE "FAMILY OF CURVES" THAT RESULT from FUNCTIONS WHERE THE terms ARE to the 1st power ($Ax + By + C = 0$)

THE general 2ND degree EQUATION IS:

$$Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$$

EXCEPT for SPECIAL CASES that result IN POINTS OR LINES, the graph OF every 2ND degree EQUATION is PART of A circle, ellipse, PARABOLA, or hyperbola.

For our class, we will simplify the general 2ND degree equation & only deal WITH PARABOLAS, for these we'll let B & $C = 0$ & we'll RELETTER STARTING WITH A & solve for y SO THE "QUADRATIC FUNCTION" IS: $\boxed{y = Ax^2 + Bx + C}$ ← WILL GRAPH A PARABOLA

EACH CURVE HAS UNIQUE properties, we'll STUDY some OF THE key properties OF THE PARABOLA IN this course. THERE ARE MANY IMPORTANT CURVES THAT ARE NOT circles, ellipses, PARABOLAS, or hyperbolas!

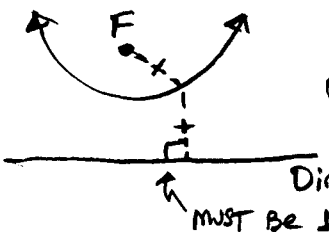
Parabolas By Geometry

Parabolas, like circles, ellipses, & hyperbolas, can be defined geometrically. A "locus" (from the Latin for "place" or "location") is a set of points that meet a certain condition. We'll skip the hyperbola but lets look at the circle, ellipse, & parabola as a locus of points.

Circle – the locus of all points (in a plane) that are a given distance from a given point.

Ellipse – the locus of all points (in a plane) such that for each point on the curve the sum of the distances from two given points (focal points) is a constant.

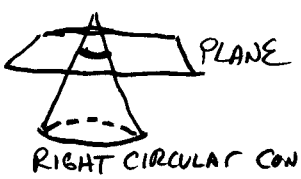
Parabola – the locus of all points (in a plane) such that each point on the curve is the same distance from a given point (focus) as a given line (directrix).



Parabolas By Conic Sections

Another way to define circles, ellipses, parabolas, & hyperbolas is to intersect a plane with a right circular cone.

(Ex) Circle



* Ref: Flashlight Demo