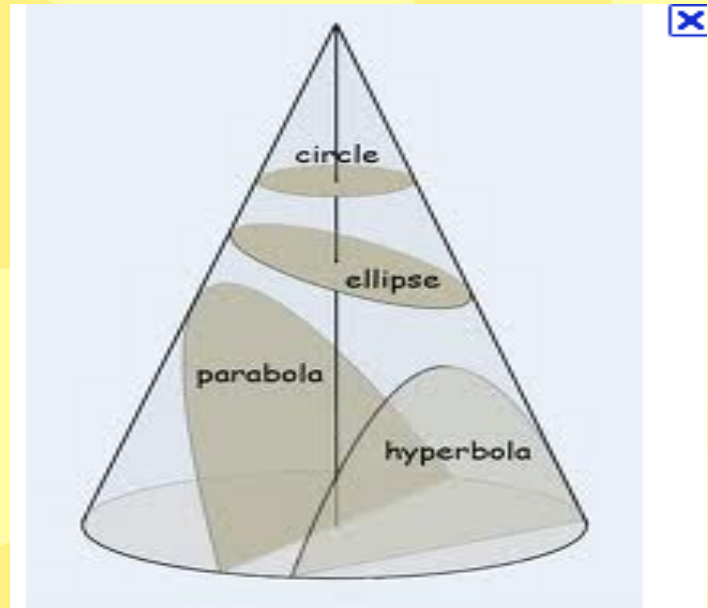


# A CONICOPIA OF FUN!



## WHAT ARE THE CONIC SECTIONS?

Menaechmus ~ 350 BC

Archimedes

Apollonius

Pappus ~ 300 AD

Kepler ~ 1620 AD

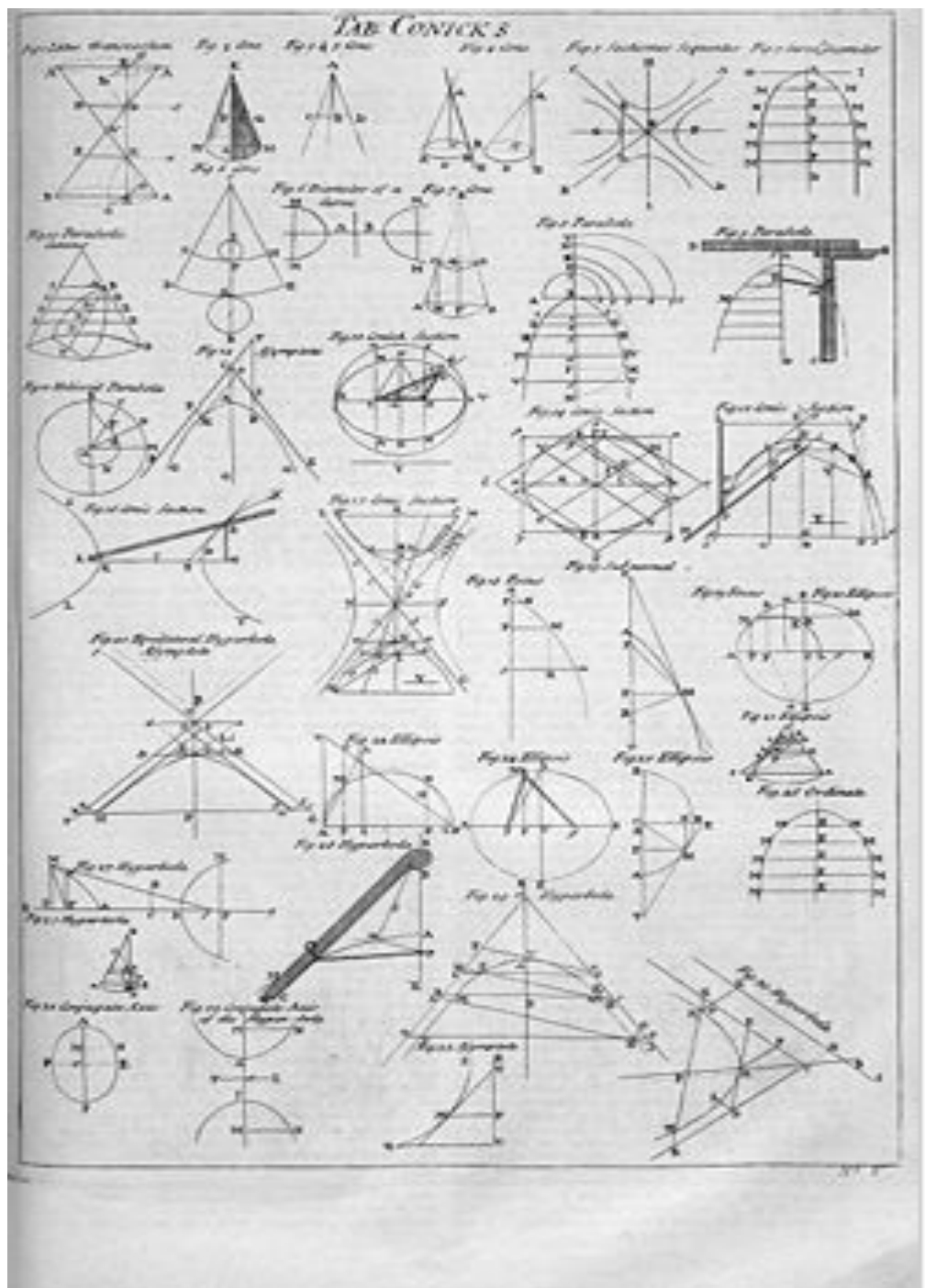
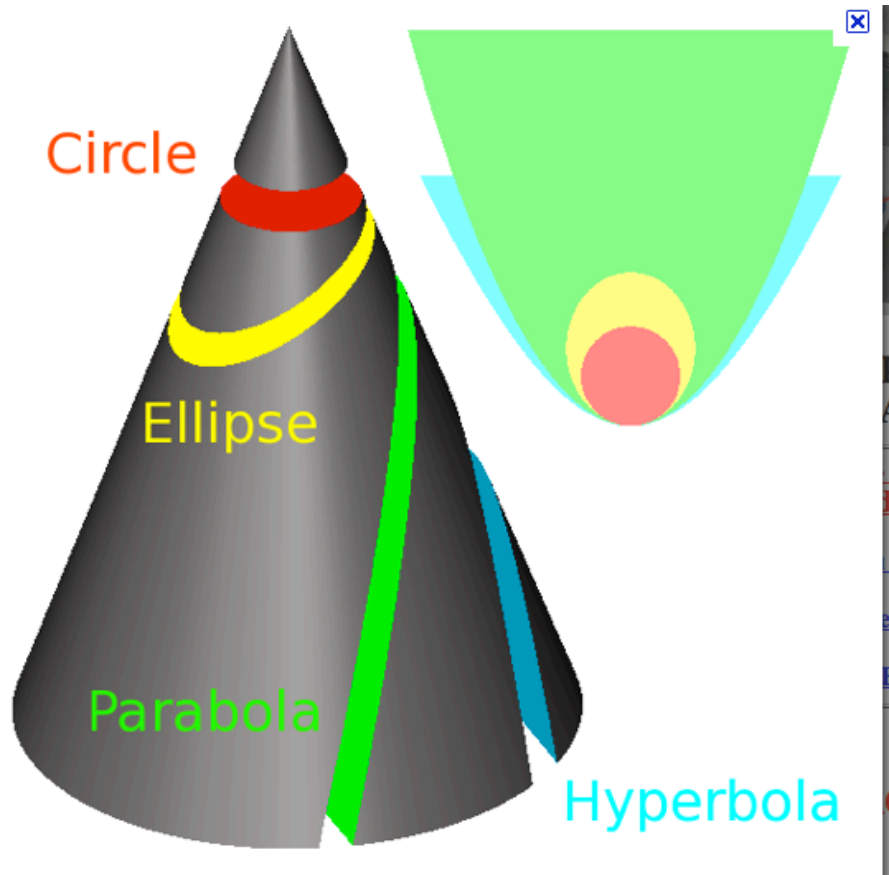
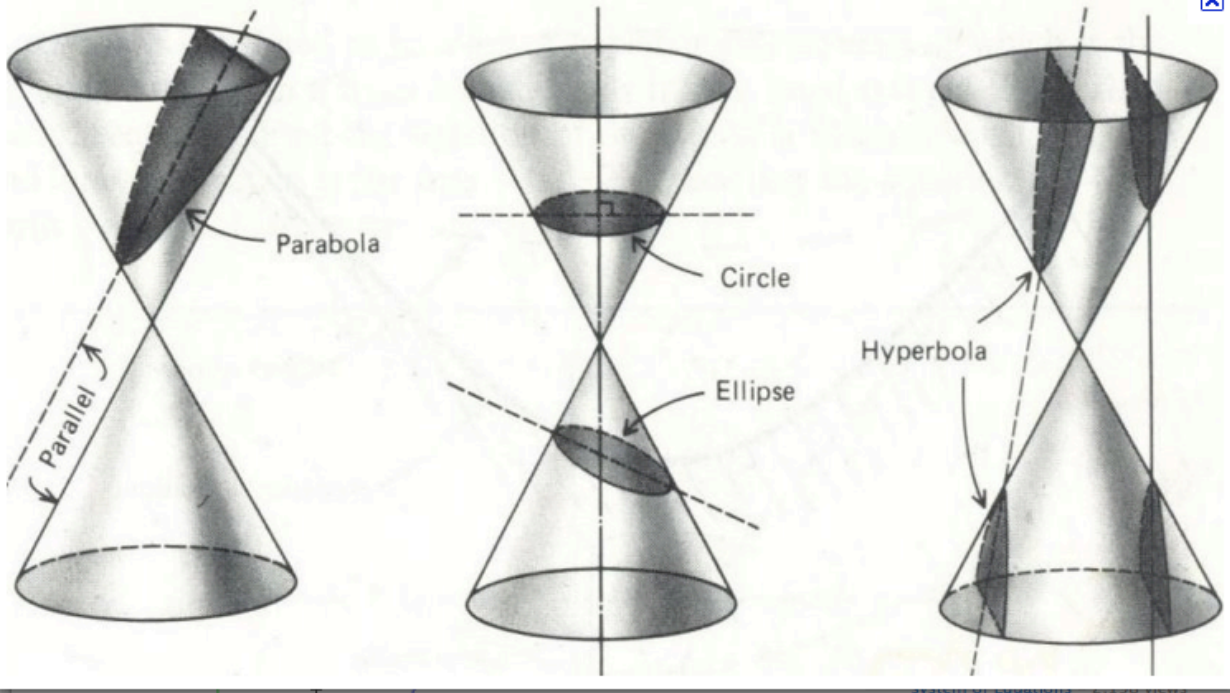


Table of conics, *Cyclopaedia*, 1728



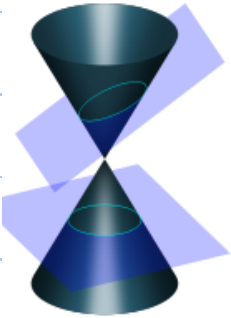






# THE ELLIPSE

Label center, foci, vertices,  
major axis, minor axis.



Eq:

a =

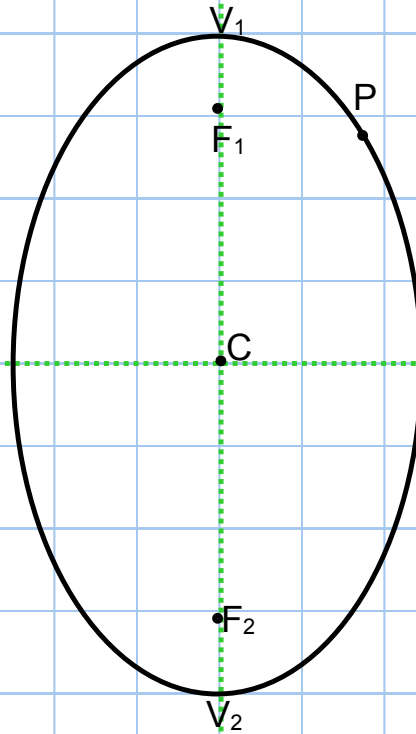
Standard:

b =

General:

c =

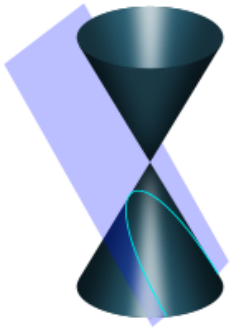
e =



Check  $a^2 = b^2 + c^2$   
error =?

Check definition  
 $PF_1 + PF_2 = 2a$

# THE NOT NECESSARILY FUNCTIONAL PARABOLA



Eq:

Directrix:

Axis of symmetry

Standard:

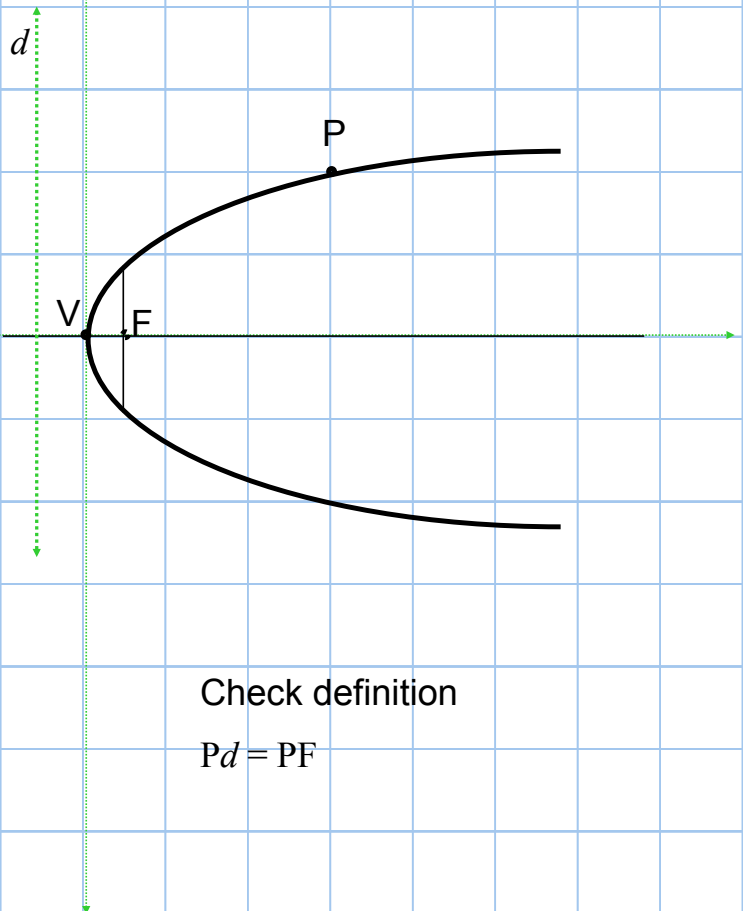
General:

Label focus, vertex, directrix,  
Latus Rectum, axis of  
symmetry.

LR =

$p =$

$e =$



Check  $LR = 4p$

error = ?

Check definition

$Pd = PF$



## THE HYPERBOLA

Eq:

Asymptotes:

Standard:

General:

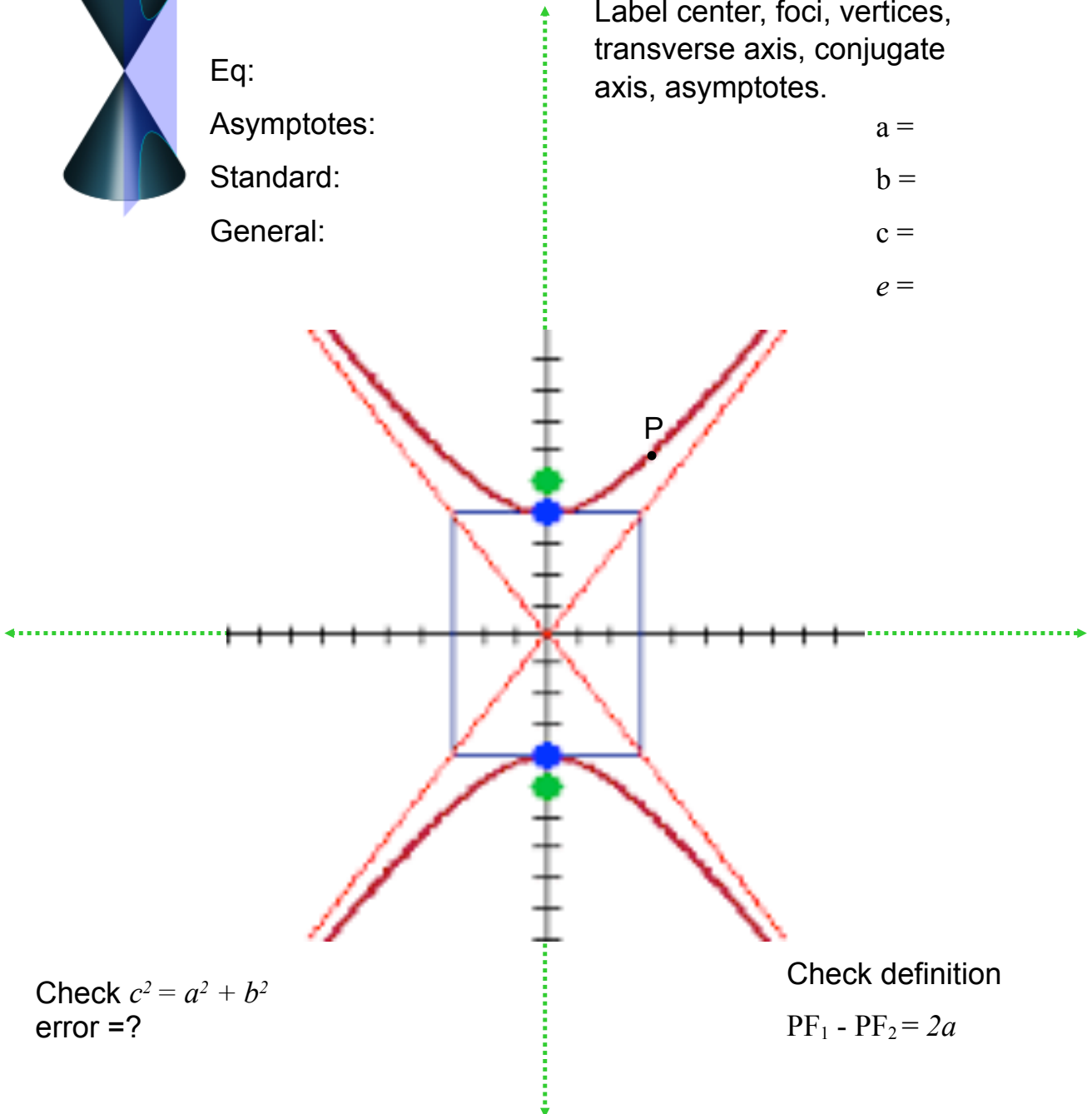
Label center, foci, vertices,  
transverse axis, conjugate  
axis, asymptotes.

$a =$

$b =$

$c =$

$e =$



Check  $c^2 = a^2 + b^2$   
error = ?

Check definition  
 $PF_1 - PF_2 = 2a$

General form for a conic equation:  $Ax^2 + By^2 + Cx + Dy + E = 0$

To move the center away from the origin?

Standard form:

Ellipse:

Hyperbola

Parabola

When is a conic equation degenerate?

Let's complete the square and sketch the conic!

s  $49x^2 + 9y^2 - 196x - 54y - 164 = 0$

k  $25x^2 - 4y^2 + 150x - 32y + 61 = 0$

d  $y^2 + 8x - 6y + 1 = 0$

Let's write an equation and sketch the graph.

<sup>f</sup>  $p = -3$

$$e = 1$$

vertex at  $(2, 6)$

Directrix,  $y = 9$

<sup>m</sup> Center at  $(-2, -3)$

Slope of asymptotes:  $\pm 1/2$

$$a = 1$$

$$b = 2$$

$$c = \sqrt{5}$$

$$e =$$

<sup>a</sup> Center at  $(-2, 3)$

Vertex at  $(2, 3)$

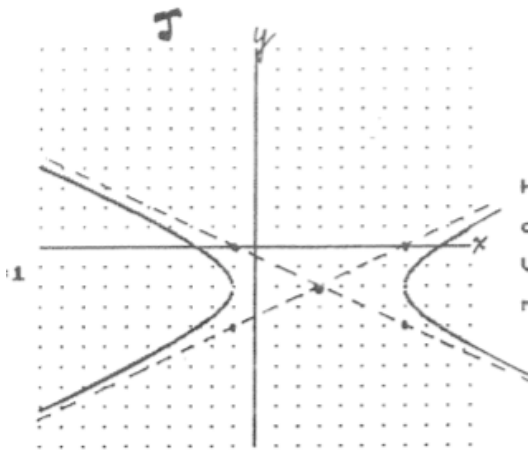
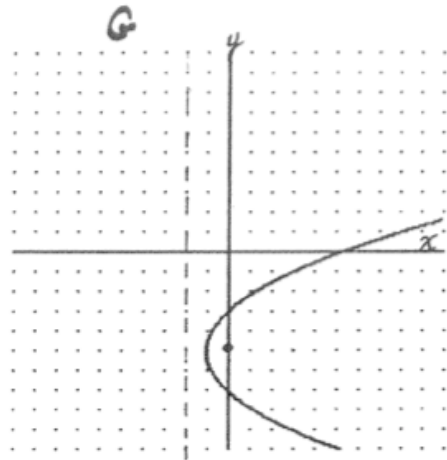
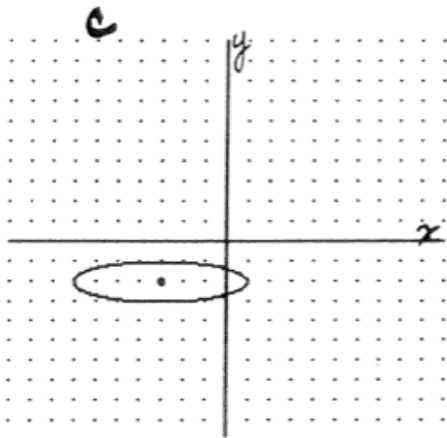
$$a = 4$$

$$b = 2$$

$$c = 2\sqrt{3}$$

$$e =$$

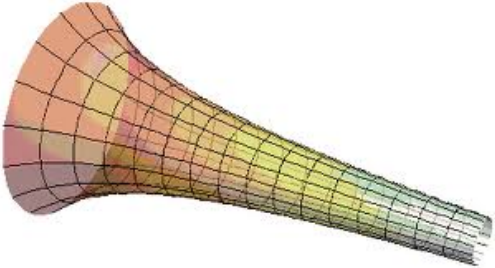
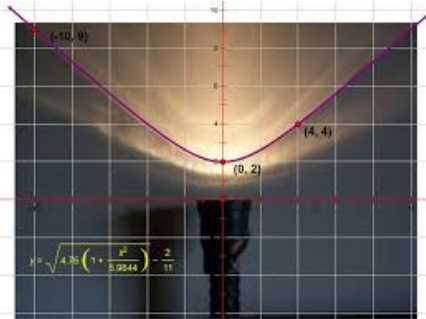
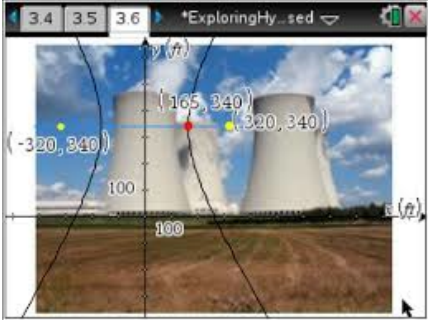
Can we write an equation for these?

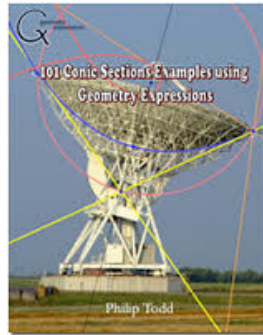


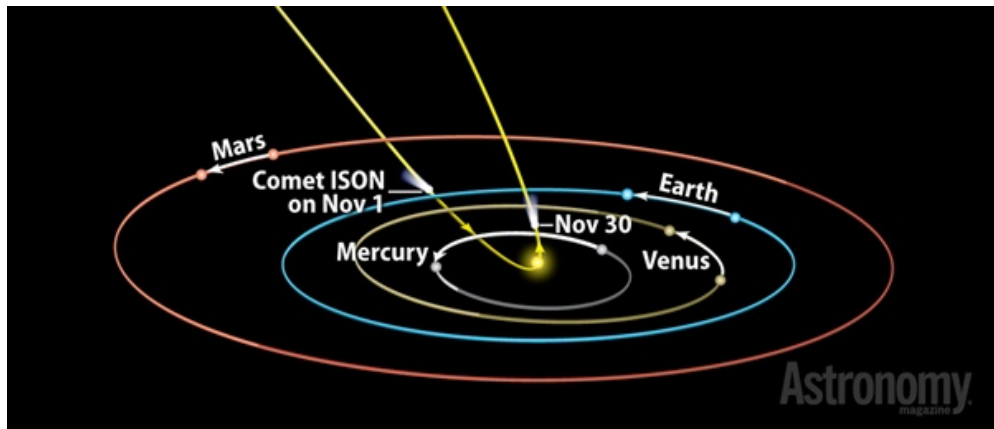
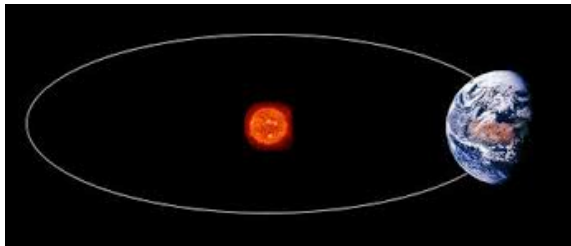
12



Examples of conic shapes









## The Human Ellipse



As the foci move together... a Human Circle





# The Human Hyperbola

'93





Parabola ~ General

$$x^2 = -8.6(y+3)$$

Parabola ~ Standard

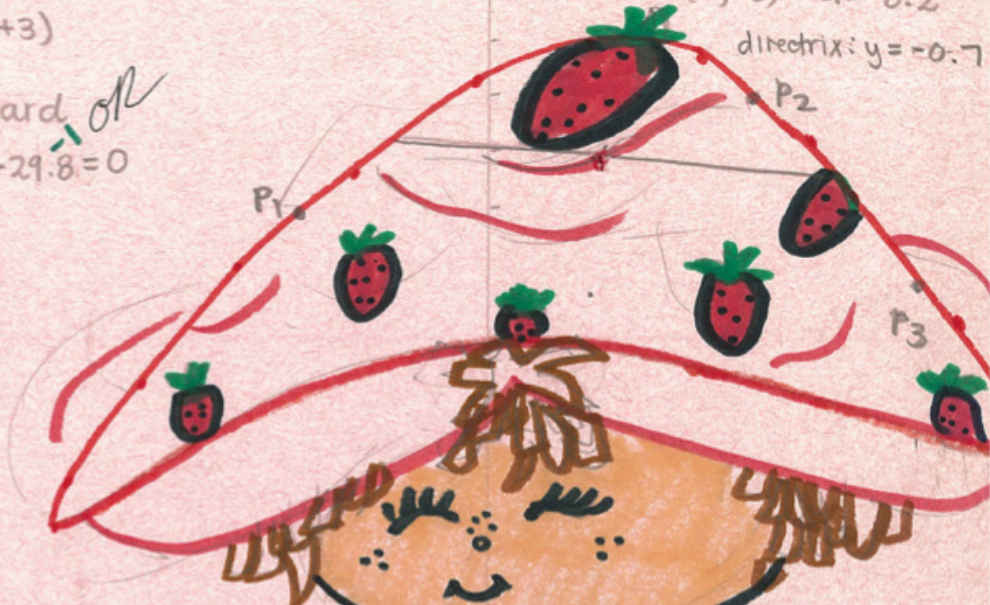
$$x^2 - 4x + 8.6y + 29.8 = 0$$

$$p = -2.3$$

$$e = 1$$

$$\text{vertex} = (2, -3) \quad LR = 8.2$$

$$\text{directrix: } y = -0.7$$



LR

$$= 8.2$$

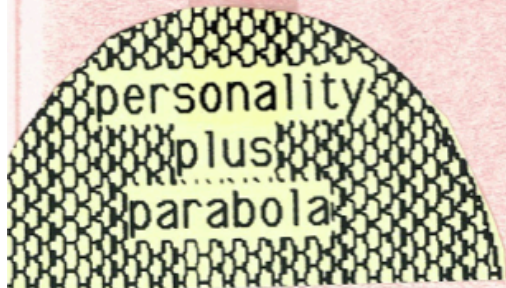
$$\text{ecc} = 0.4$$



Definition: A set of points equidistant to the focus & the directrix.

$$P_1: 5.3 = 5.4$$

$$P_2: 3.0 = 3.1$$



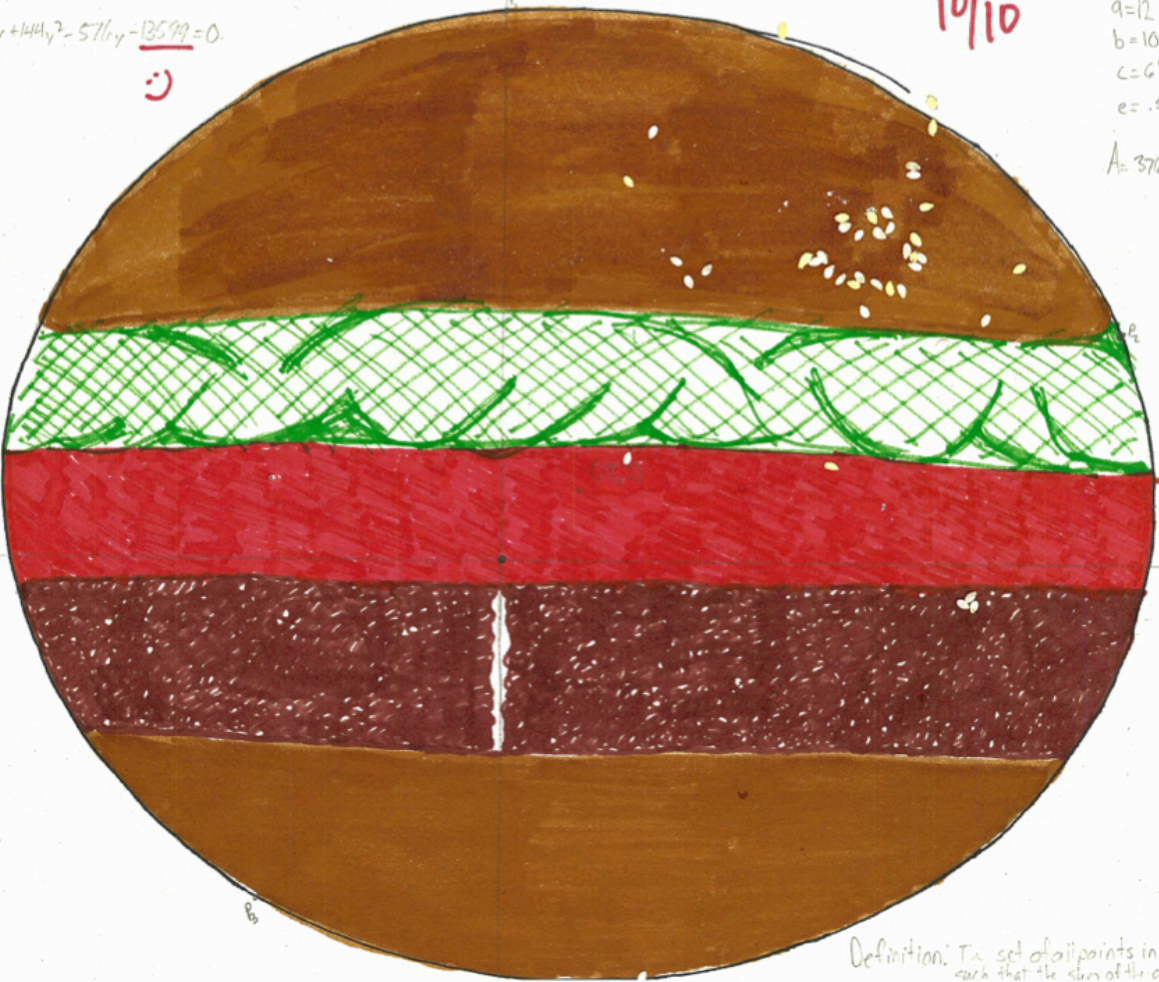
$$y^2 - 300y + 144y^2 - 576y - 13599 = 0$$

☺

10/10

$$\begin{aligned} a &= 12 \\ b &= 10 \\ c &= 6\frac{1}{2} \\ e &= .54 \end{aligned}$$

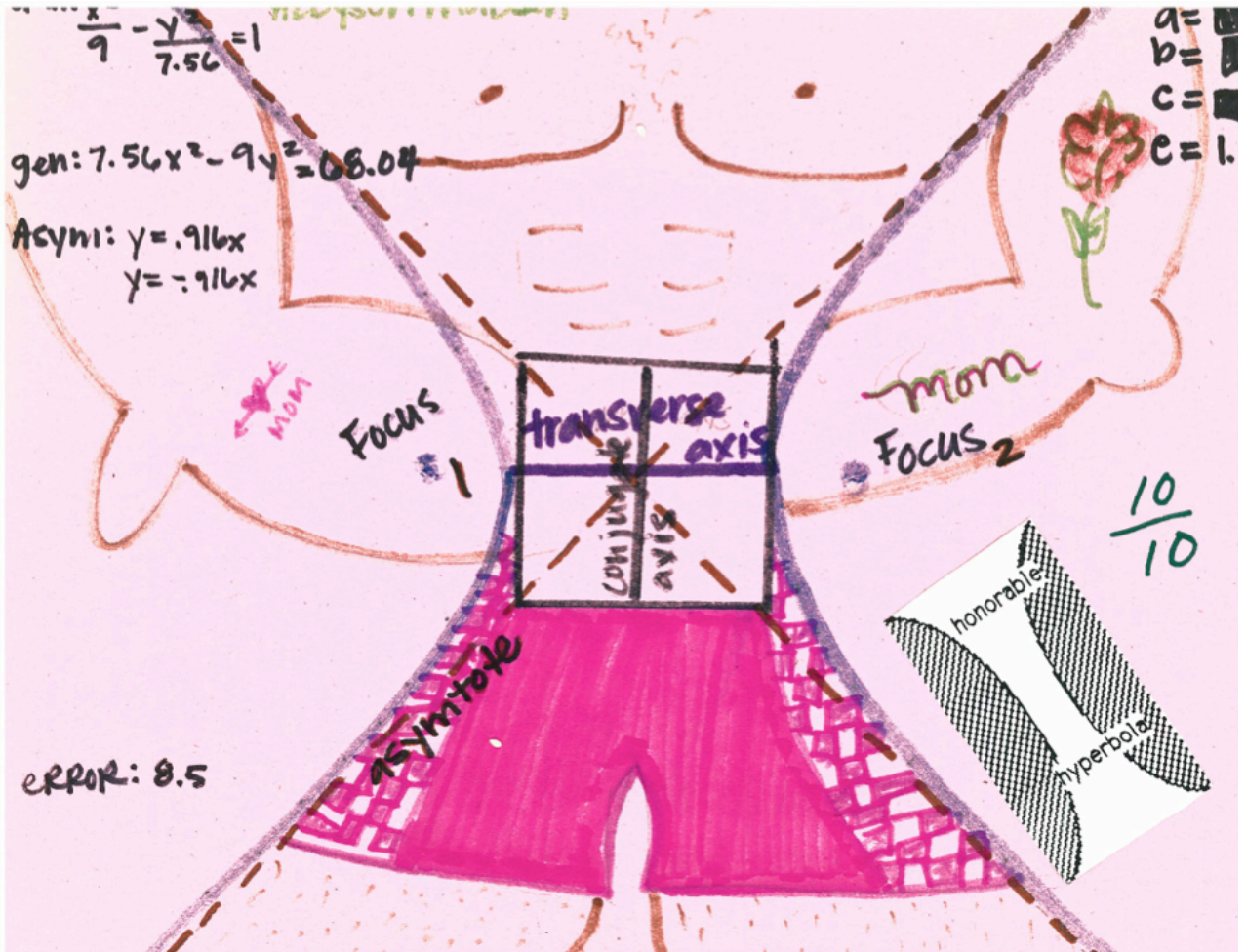
$$A = 376.9$$

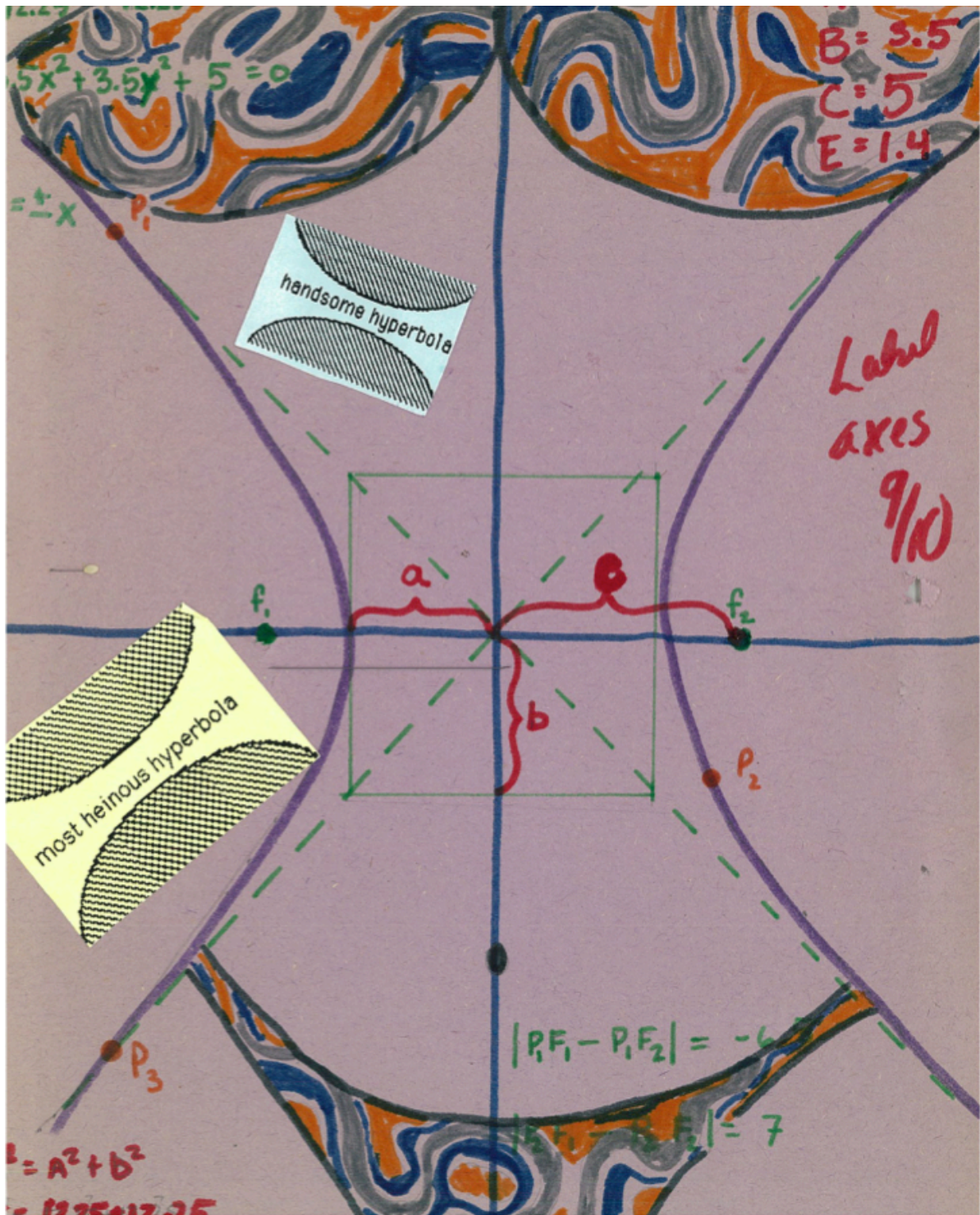


$$\begin{aligned} 40.25 \\ - 1.75 \end{aligned}$$

Definition: The set of all points in the such that the sum of the dist









1910

# THE CONIKERS





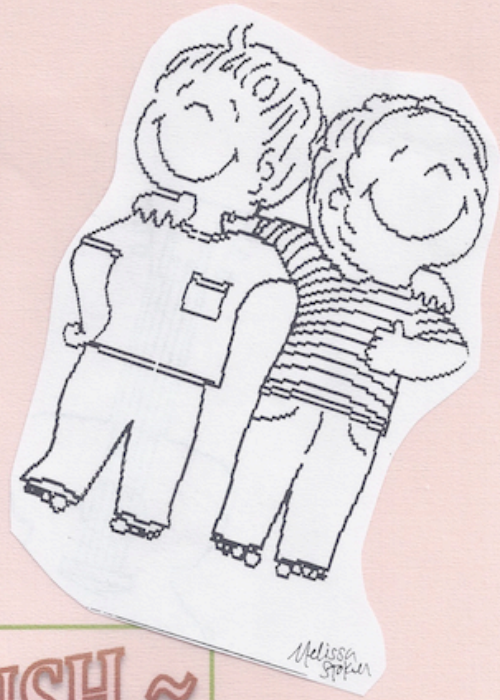
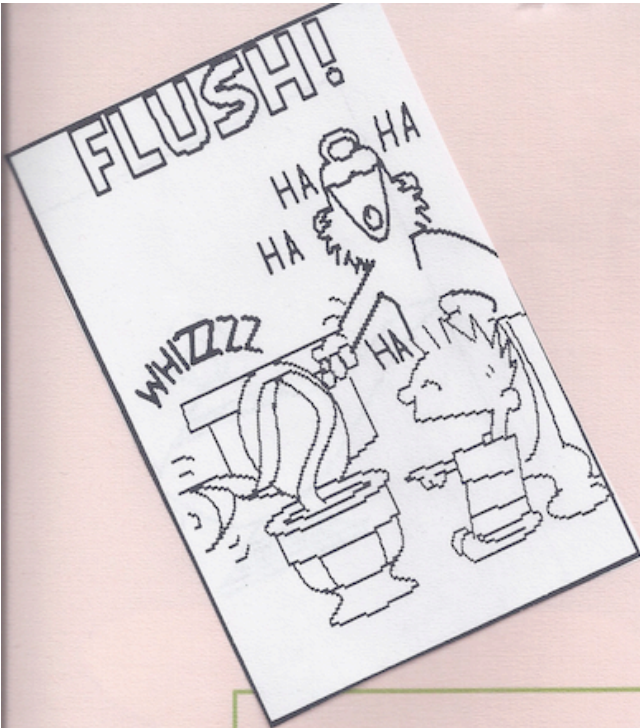




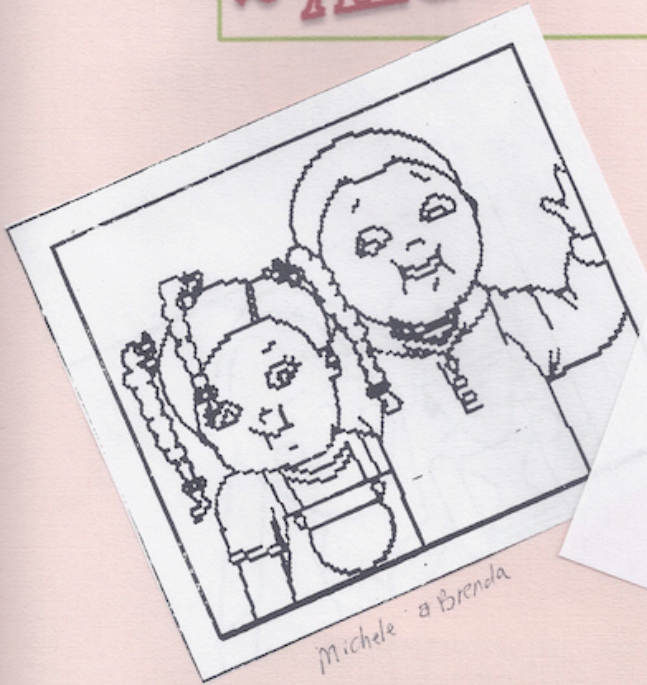


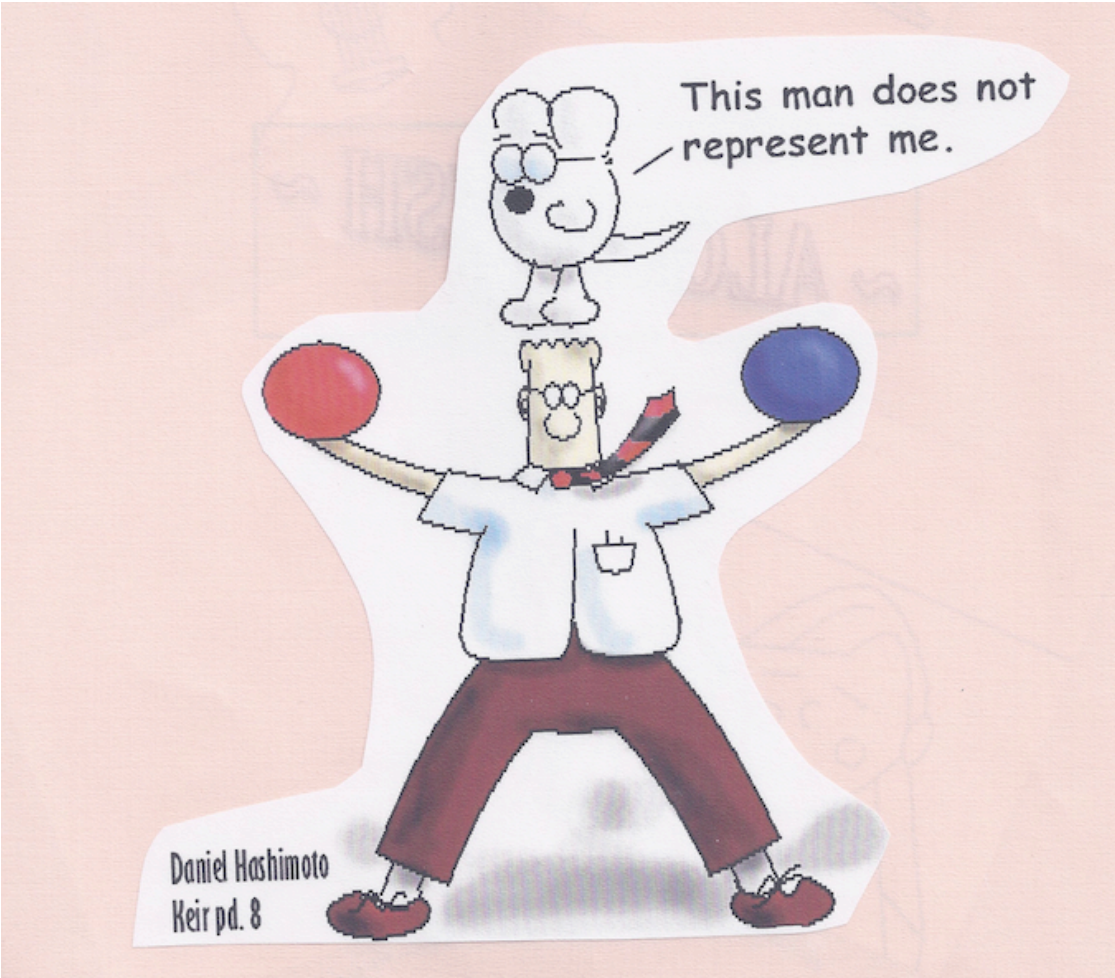
Vincent  
1890 Van  
Conic  
— Jessica Harrison  
— Krysta Newman





~ ALGEBRUSH ~





Daniel Hashimoto  
Keir pd. 8



