BE – Alg. 2 | WEDNESDAY | 4-4-12

ACT PRACTICE

① $-|x-3| - |2x-6|$, if $x=-2$

② $13\left(\dfrac{1}{\frac{1}{5}+\frac{2}{3}}\right)$

③ A rectangular lot that measures 150 ft. by 200 ft. is completely fenced. What is the approximate length, in feet, of the fence?

④ On 4 quizzes a student scored 65, 73, 81 and 82%. What must the Quiz 5 score be to have an average of 80%?

ANS)

① $-|(-2)-3| - |2(-2)-6|$

$-|-5| - |-4-6|$

$-(5) - (10) = \boxed{-15}$

② $13\left(\dfrac{1}{\frac{3}{15}+\frac{10}{15}}\right) = 13\left(\dfrac{1}{\frac{13}{15}}\right) = 13 \cdot \dfrac{15}{13} = \boxed{15}$

③ $200+200+150+150 = \boxed{700\text{ ft}}$

④ $\overline{80} \Rightarrow$ 65, 73, 81, 82,

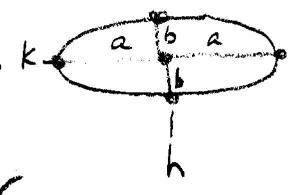
$-15 \quad -7 \quad +1 \quad +2 \Rightarrow -19 \therefore 80+19 = \boxed{99}$

Alg. 2 HW Review – Pg 438 # 8, 10

(8) $$\frac{(x-1)^2}{20} + \frac{(y+2)^2}{4} = 1$$

$a^2 = 20$ $\quad$ $b^2 = 4$ $\quad$ } Since a^2 is under x $\Rightarrow$

$a = 2\sqrt{5}$ $\quad$ $b = 2$



$\boxed{\text{Major Axis} = 4\sqrt{5} \text{ units}}$ length $\quad$ $\boxed{\text{Minor Axis} = 4 \text{ units}}$ length

Center $\boxed{C(1, -2)}$
h, k

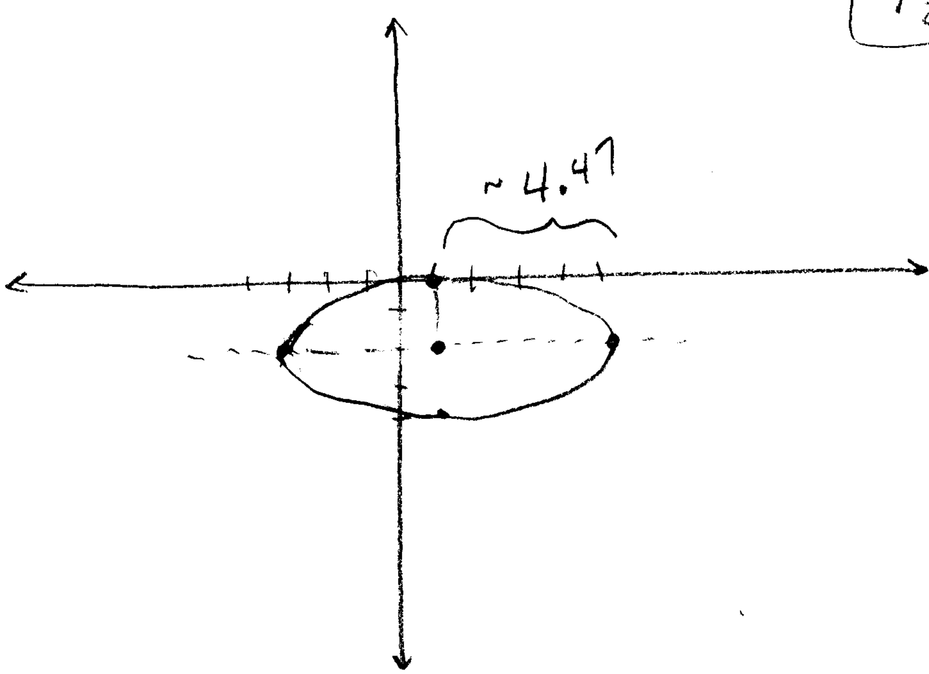
$c^2 = a^2 - b^2 = 20 - 4 = 16$

$\therefore c^2 = 16$ $\quad$ $c = 4$ $\quad$ So Foci are at $(h \pm 4, k)$

$F(1 \pm 4, -2)$

$\boxed{F_1(5, -2) \quad F_2(-3, -2)}$

Note: $2\sqrt{5} \approx 4.47$



⑩ $x^2 + 25y^2 - 8x + 100y + 91 = 0$

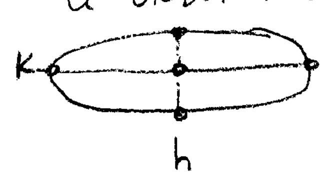
$x^2 - 8x + 4^2 + 25y^2 + 100y = -91 + 16$

$(x-4)^2 + \overset{25\cdot 4}{25(y^2 + 4y + 2^2)} = -75 + 100$

$$\frac{(x-4)^2}{25} + \frac{25(y+2)^2}{25} = \frac{25}{25}$$

$$\frac{(x-4)^2}{25} + \frac{(y+2)^2}{1} = 1$$

$\overleftrightarrow{\;}$ a^2 UNDER X ∴

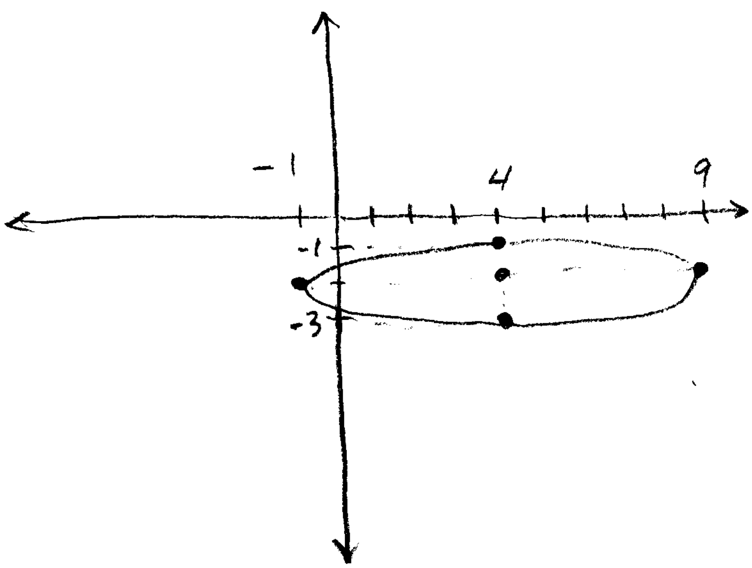


$a^2 = 25$
$a = 5$
∴ $\boxed{\text{length of major Axis} = 10}$

$b^2 = 1$
$b = 1$
$\boxed{\text{length of minor Axis is } 2}$

$\boxed{\text{Center } (4, -2)}$
h, k

Foci $c^2 = a^2 - b^2$ ∴ $c^2 = 24$
$c = 2\sqrt{6}$ ∴ Foci ⇒
$(h \pm c, k)$
$\boxed{F(4 \pm 2\sqrt{6}, -2}$

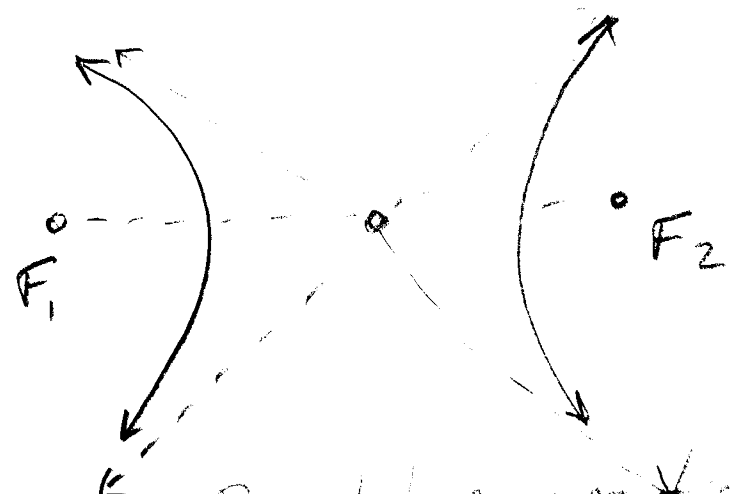


Intro. to Hyperbolas (see Ch. 8-5)

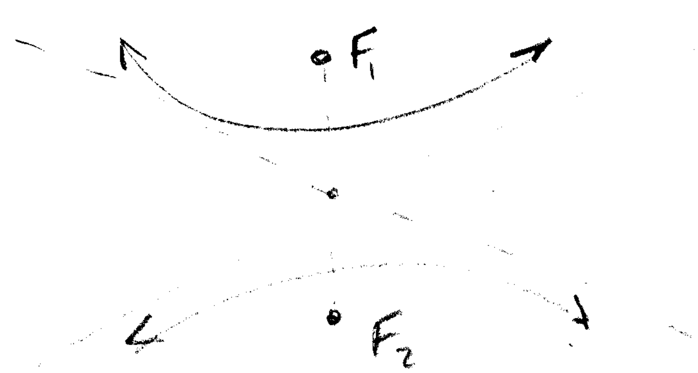
Similar concept to locus definition of ellipse ⇒ sum of $d_1 + d_2$ to foci = constant

hyperbola ⇒ difference of $d_1 - d_2$ to foci = constant
(subtract)

Result is two, bounded curves



Bounded asymptotically by 2 lines



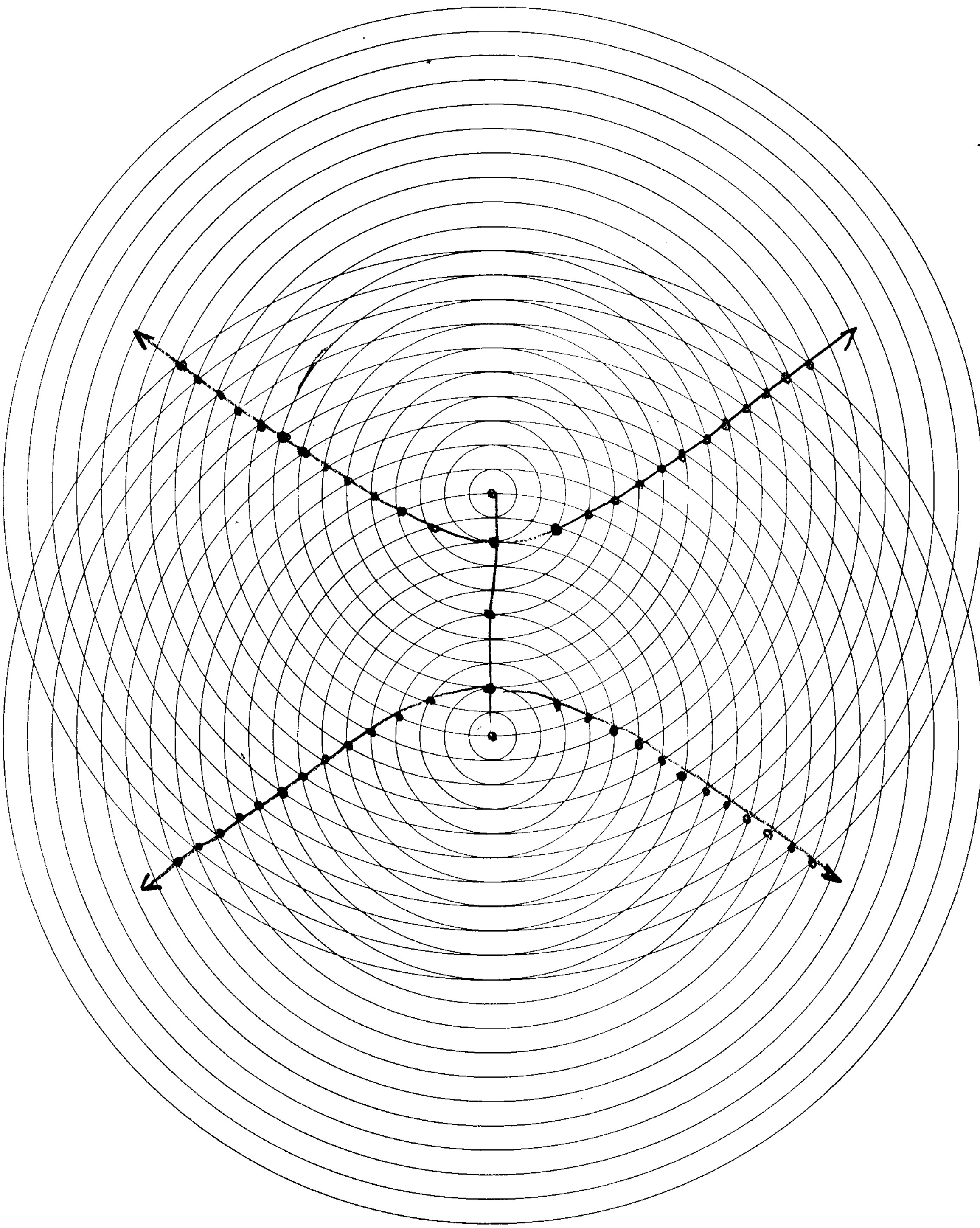
$$\boxed{\frac{(x-h)^2}{a^2} - \frac{(x-k)^2}{b^2} = 1}$$

Ex

Conic Graph Paper

(overlapping circles)

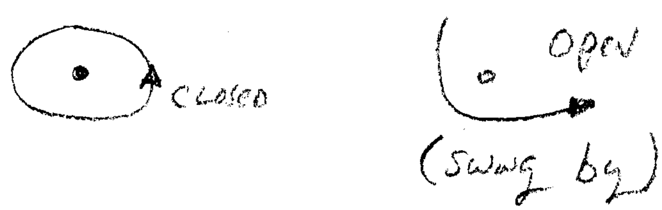
Hyperbola – Difference of distances to focal points = 6 x 15-9



Some "real world" places to find hyperbolas ⇒

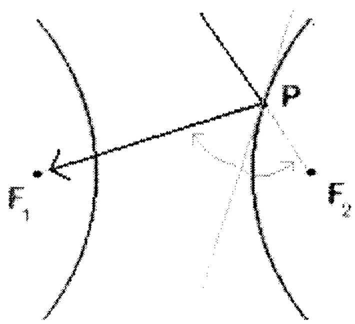
- Cooling towers
- Cassegrain telescopes (see blind spot link on bulldogmath)

- Ripples from 2 rocks in a pond.
- rocket nozzles.
- Sonic boom (where the sound waves strikes the earth)
- Shape of an "open" orbit vs. closed (ellipse)

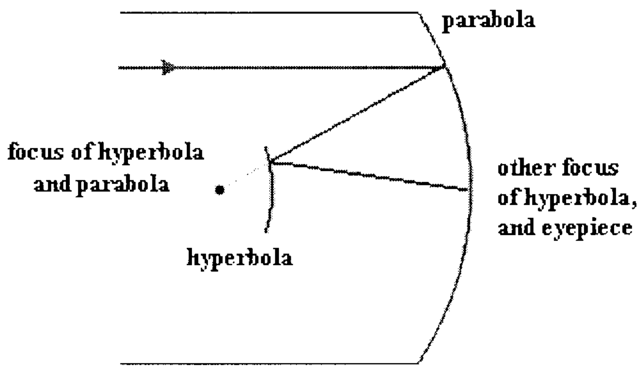


The reflection property of the hyperbola is of great importance in optics. Let P be any point on one branch of the hyperbola. Then the line segments joining P to each of the foci form an angle which is bisected by the tangent line at P.

http://www.mathacademy.com/pr/prime/articles/conics/index.asp



Consequently, any ray approaching one of the foci from a convex side of the hyperbola is reflected to the opposite focus. An example of an application of this principle is the Cassegrain reflecting telescope:



A concave parabolic mirror forms the back of the telescope, and this shares a focus with a convex hyperbolic mirror, the other focus of which is at the eyepiece.

Ch. 8-6 Conic Sections (Classify)

PARABOLA $y = a(x-h)^2 + k$

Circle $(x-h)^2 + (y-k)^2 = r^2$

Ellipse $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$

Hyperbola $\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$

See pg. 449

Looking at all the combinations of x^2, y^2, x^1, y^1 and numbers:

$$\boxed{Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0}$$

Usually $B = 0$, the xy term "Rotates" the conic section, $xy = c$ is a special case of a hyperbola

PARABOLA $A = 0$ or $C = 0$

CIRCLE $A = C$

Ellipse $A \neq C$ But both are + or both −

Hyperbola A and C have opposite signs.

Complete squares on x's or y's to put in standard form $= (h, k)$ form

Ex 2 Pg. 450 Parabola, circle, ellipse, or Hyperbola?

(A) $y^2 - 2x^2 - 4x - 4y - 4 = 0$

$A = -2$ $C = 1$ opposite signs, hyperbola

(B) $4x^2 + 4y^2 + 20x - 12y + 30 = 0$

$A = 4$ $C = 4$ $A = C \Rightarrow$ circle.

(C) $y^2 - 3x + 6y + 12 = 0$

$A = 0$ (no x^2 term), $C = 1$ parabola

More:

(d) $x^2 - 14x + 4 = 9y^2 - 36y$

Put in General Form

$x^2 - 9y^2 - 14x - 36y + 4 = 0$

$A = 1$ $C = -9$ opp. signs = hyperbola

(e) $5x^2 + 6x - 4y = x^2 - y^2 - 2x$

$-x^2 \quad +2x \qquad -x^2 \qquad +2x$

$4x^2 + y^2 + 8x - 4y = 0$

$A = 4$ $C = 1$ $A \neq C$ Ellipse

(Both +)

HW: Practice for HW 2 Worksheet