

# Math 112

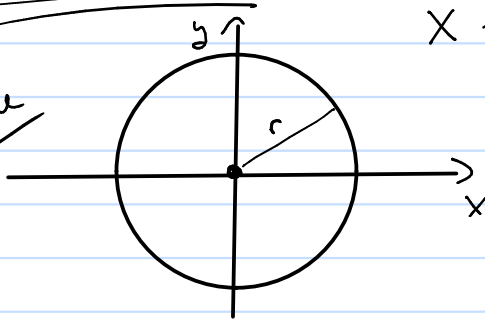
**Q's**

7.4 (#1)

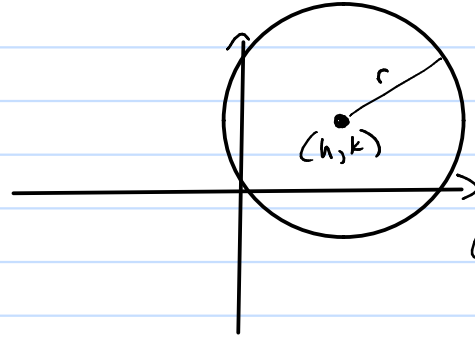
Find the vertices and foci of the conic section  $(\frac{x-5}{8})^2 - (\frac{y-5}{1})^2 = 1$

## Conic Sections

circle

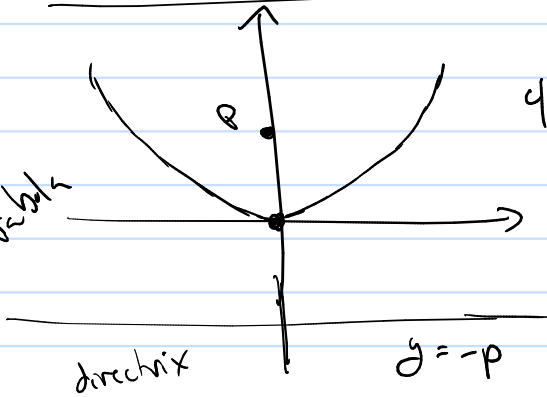


$$x^2 + y^2 = r^2$$



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

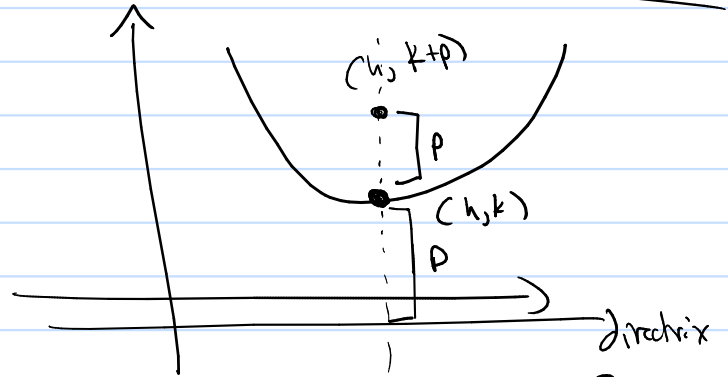
parabola



$$4py = x^2$$

directrix

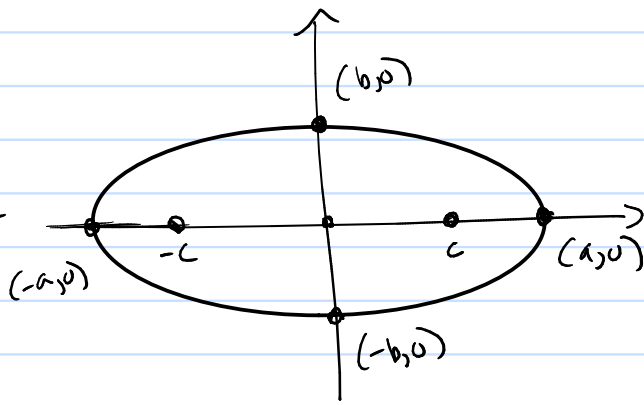
$$y = -p$$



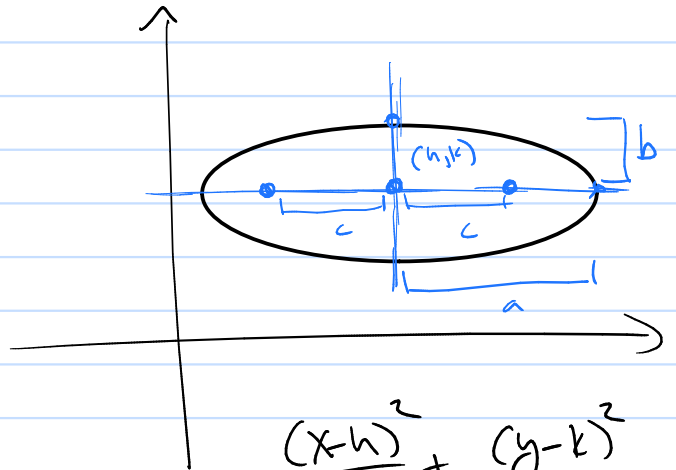
$$4p(y-k) = (x-h)^2$$

directrix

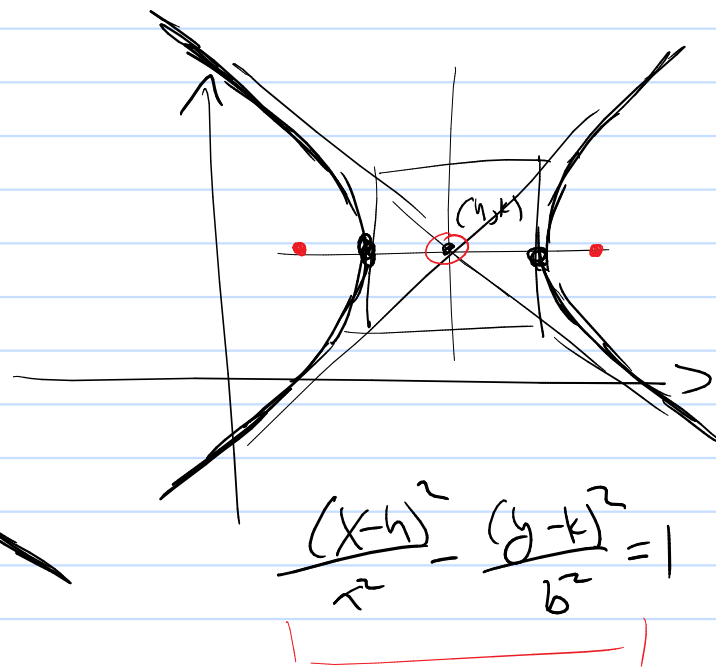
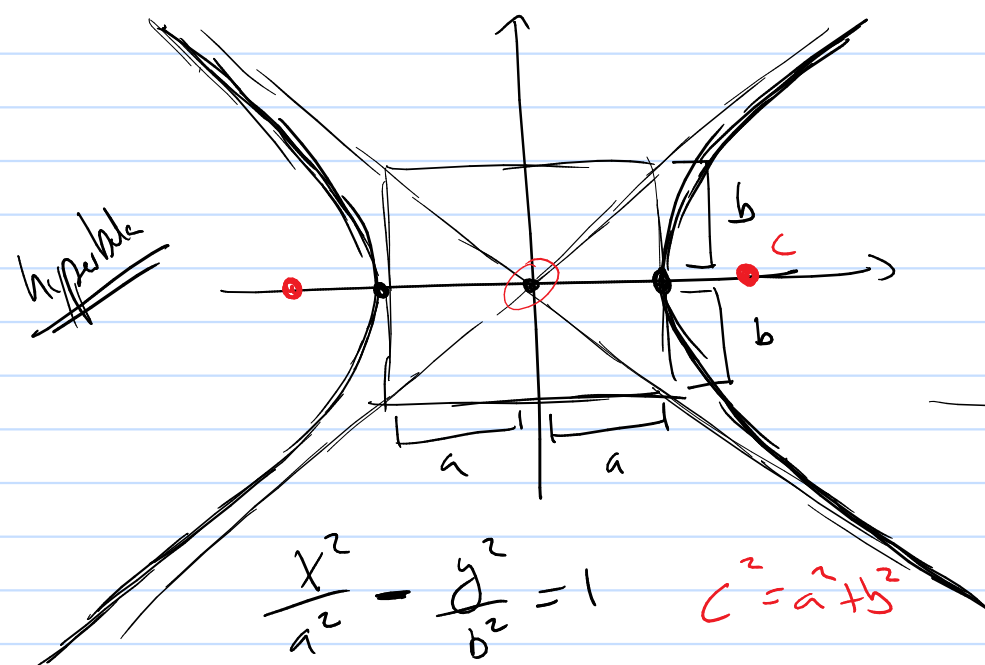
ellipse



$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

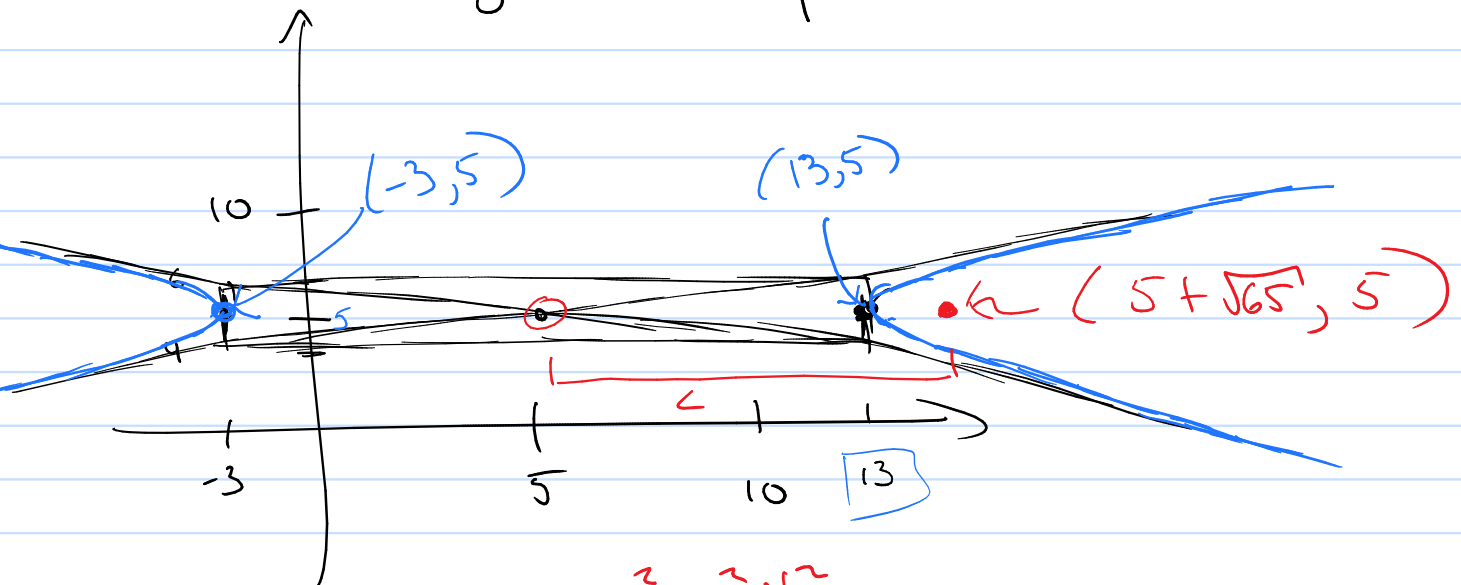


$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$$



Q Find the vertices and foci of the conic section  $\left(\frac{x-5}{8}\right)^2 - \left(\frac{y-5}{1}\right)^2 = 1$

$$\frac{(x-5)^2}{8^2} - \frac{(y-5)^2}{1^2} = 1$$



$$c^2 = a^2 + b^2$$

$$c^2 = 8^2 + 1^2$$

$$c^2 = 65 \quad c = \sqrt{65}$$

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

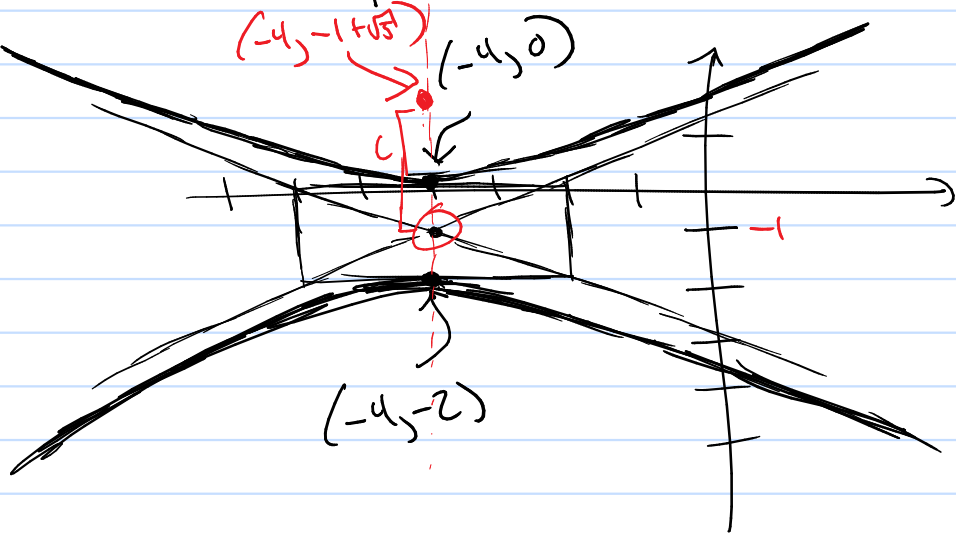
- hyperbola

- center  $(-4, -1)$

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

- opens up/down

- box is  $\begin{matrix} 2 & x & 1 \\ \uparrow & & \uparrow \\ x & & y \end{matrix}$



$c^2 = a^2 + b^2$   
 $c^2 = 5$   $c = \pm\sqrt{5}$

Exam

11 probs take home

9.1

(2 probs)

closed

(1) (a)  $\sum_{n=4}^7 (3n - n^2)$  is  $12-16, 15-25, 18-36, 21-49$   
 is  $-4, -10, -18, -28$

ide to seq

(b)  $a_0=1, a_1=2, a_2=3, a_3=0, a_4=-4, a_5=-1$

$a_n = a_{n-1} - 2a_{n-2} + a_{n-3}$  ✓

Seq  $(1, 2, 3, \underline{3 - 2(2) + 1})$ ,

$1, 2, 3, 0, \underline{0 - 2(3) + 2}$ ,

② Seq  $\rightarrow$  rule?

① ex 0, 3, 8, 15, 24, ...

open rule?  $\left\{ \begin{array}{l} a_1 = 0 \\ a_n = a_{n-1} + (2n-1); n=2,3,4, \dots \end{array} \right.$

closed rule?  $\left\{ n^2 - 1 \right\}_{n=1}^n$

and check!

9.2 (2 probs) know  $\sum_{k=1}^n c$ ,  $\sum_{k=1}^n k$ ,  $\sum_{k=1}^n k^2$ ,  $\sum_{k=1}^n k^3$ ,  $\sum_{k=0}^n ar^k$

① ex  $\sum_{k=1}^{101} k^2 + k = \sum_{k=1}^{101} k^2 + \sum_{k=1}^{101} k =$

② "wrong" lower bound for rule

$$\sum_{k=101}^{259} k^2 = ?$$

9.3 (2 probs)  $(a+bs)^n =$

① expand! ex  $(X + X^{-2})^7 =$  ?

② Ans. g's about expansion.

$(1 + 3x)^{1013}$

Q what is coef of  $X^{999}$  term?

ch7

(1) } circles  
(2) }

(1) from non-standard form  
to standard form and plot  
(\*) (2) Info of plot → eqn and  
plot.

(3) parabola

Info → find eqn and plot

(\*) (4) ellipse

given non-standard

→ find standard eqn and plot

(5) hyperbola

plot

given eqn