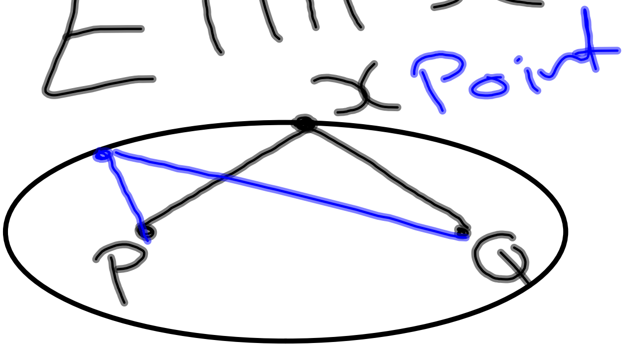
Revision

1/6/15

Ellipse

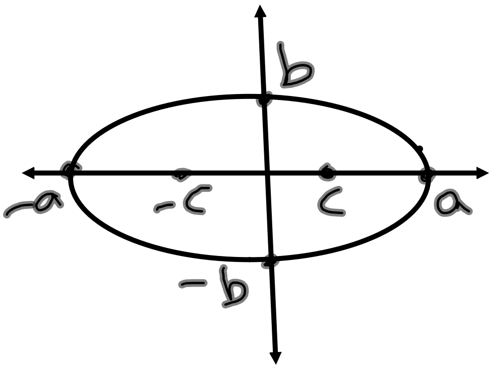


$$k = |xP + xQ|$$

$$\frac{k}{2} = a$$

Ellipse
Center(0,0)

Horizontal



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

Vertices$(\pm a,0)$

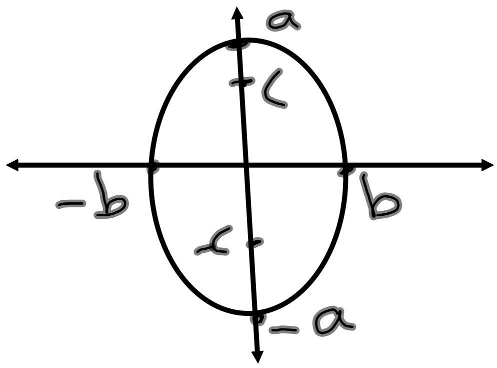
Co-vertices$(0,\pm b)$

foci$(\pm c,0)$

$$c^2=a^2-b^2$$

$$a>b>0$$

Vertical



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

$(0,\pm a)$

$(\pm b,0)$

$(0,\pm c)$

Ellipse
Center (h,k)

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

Vertices $(h\pm a, k)$ $\quad (h, k\pm a)$

foci $(h\pm c, k)$ $\quad (h, k\pm c)$

Co-vertices $(h, k\pm b)$ $\quad (h\pm b, k)$

Identify, the center, vertices, Co-vertices, foci, lengths of major axis and minor axis of the ellipse

$$\frac{(x+5)^2}{81}+\frac{(y-1)^2}{144}=1$$

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

center $(\overset{h}{-5},\overset{k}{1})$

$a=12$, $b=9$

vertices $(h, k\pm a)$

$(-5, 1+12)$, $(-5, 1-12)$

$(-5, 13)$, $(-5, -11)$

$C=\sqrt{a^2-b^2}=\sqrt{144-81}=3\sqrt{7}$

foci $(h, k\pm c)$

$(-5, 1+3\sqrt{7})$, $(-5, 1-3\sqrt{7})$

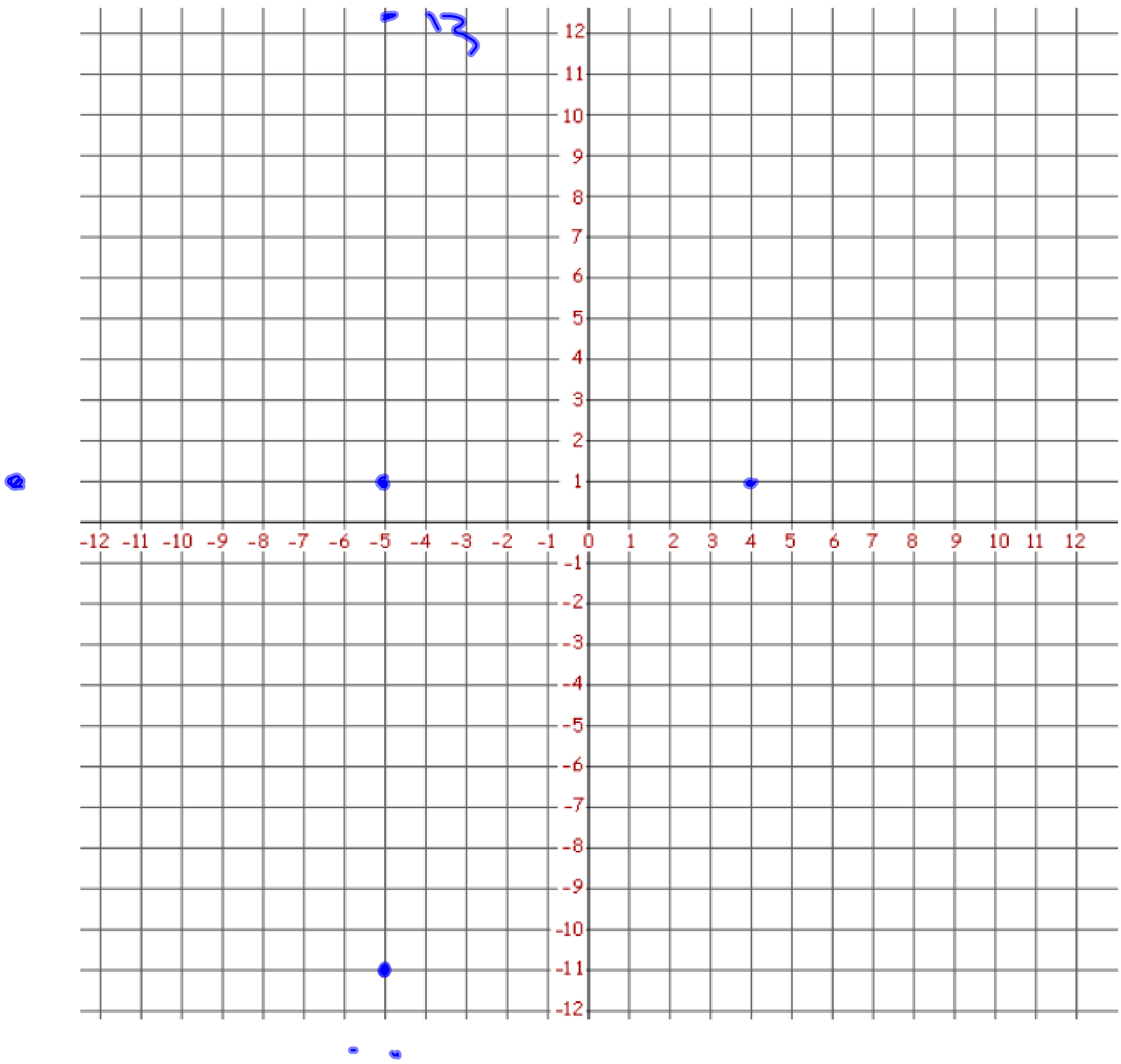
Co-vertices $(h\pm b, k)$

$(-5+9, 1)$, $(-5-9, 1)$

$(4, 1)$, $(-14, 1)$

major axis length $=24$

minor axis length $=18$

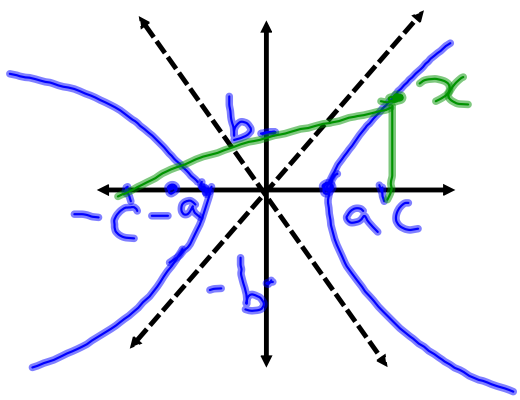

13
12 11 10 9 8 7 6 5 4 3 2 1 -1 -2 -3 -4 -5 -6 -7 -8 -9 -10 -11 -12
-12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12

Hyperbola

center(0,0)

Horizontal

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



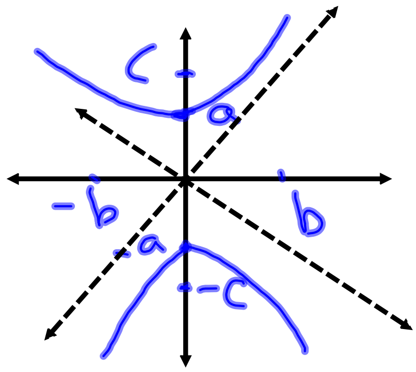
Asymptes $y=\pm\frac{b}{a}x$

Vertices$(\pm a,0)$

foci $(\pm c,0)$

Vertial

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



Asympt. $y=\pm\frac{a}{b}x$

$(0,\pm a)$

$(0,\pm c)$

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

$$k\,|xp-xa|,\ a=\frac{k}{2}$$

Horizontal Center(h,k)

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

Vert. $(h\pm a, k)$

foci $(h\pm c, k)$

Asy $y-k=\pm\frac{b}{a}(x-h)$

Vertical

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

vertices $(h, k\pm a)$

foci $=(h; k\pm c)$

Asy $y-k=\pm\frac{a}{b}(x-h)$

Label the vertices, the foci and Asymptotes of the Hyperbola $\frac{(x-2)^2}{9} - \frac{(y+3)^2}{3} = 1$

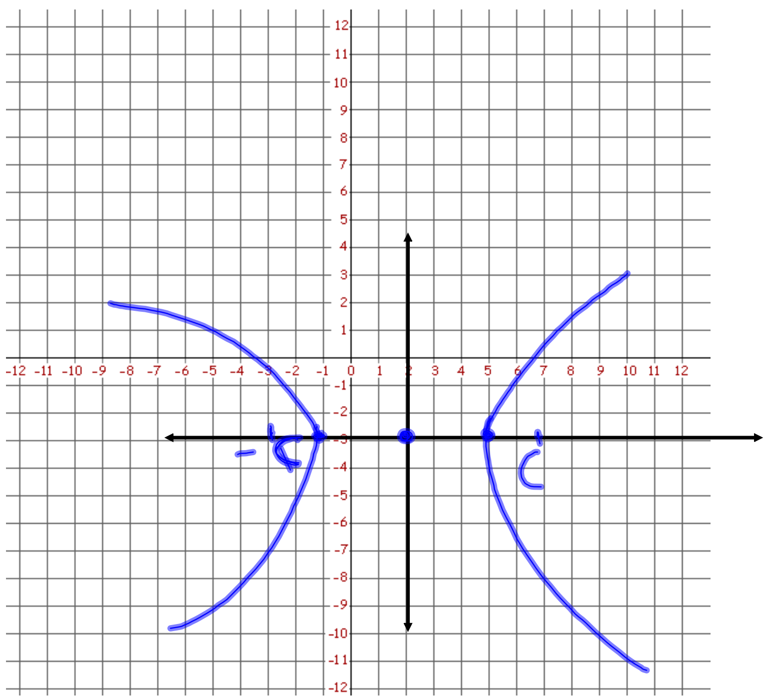
Sketch the graph

Vertices: $(5,-3)(-1,-3)$

foci: $(2+2\sqrt{6},-3)(2-2\sqrt{6},-3)$

Asy: $y+3 = \frac{\sqrt{3}}{3}(x-2)$

$y+3 = -\frac{\sqrt{3}}{3}(x-2)$



Parabola

Center (0,0)

Vertical

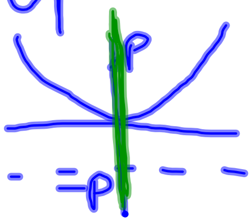
$x^2 = 4Py$

focus $(0, P)$

Directrix $y = -P$

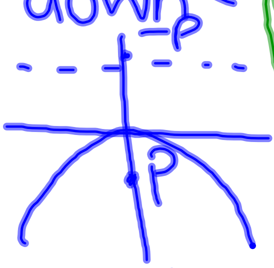
axis → y axis

up



$P > 0$

down



$P < 0$

Horizontal

$y^2 = 4Px$

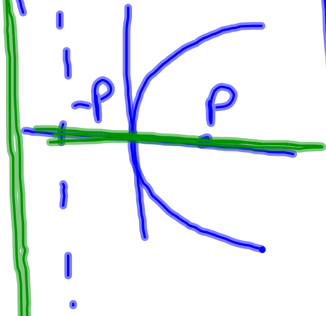
focus $= (P, 0)$

Directrix $x = -P$

axis → x axis

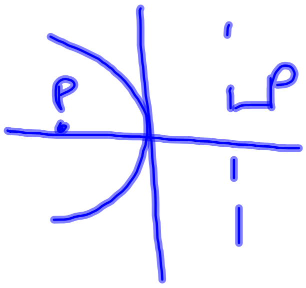
Right

$P > 0$



left

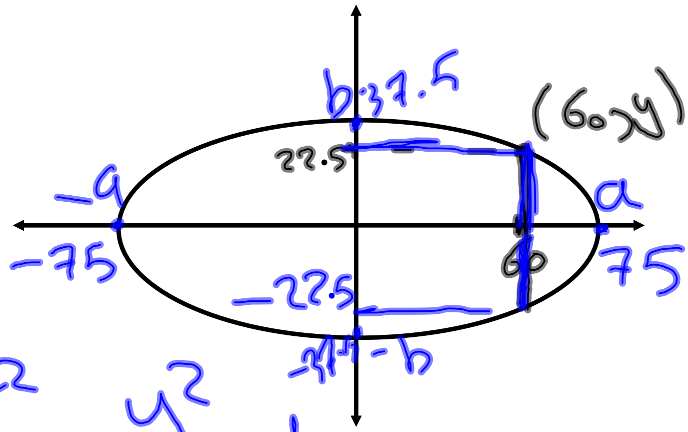
$P < 0$



Center(h, k)

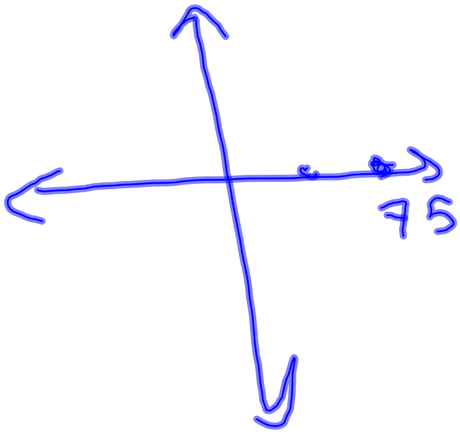
Vertical	Horizontal
$(x-h)^2 = 4p(y-k)$	$(y-k)^2 = 4p(x-h)$
directrix $y = k-p$	$x = h-p$
focus $(h, k+p)$	$(h+p, k)$

Onie



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

$$\frac{60^2}{75^2}+\frac{y^2}{37.5^2}=1$$



$$\frac{y^2}{37.5^2}=1-\frac{60^2}{75^2}$$

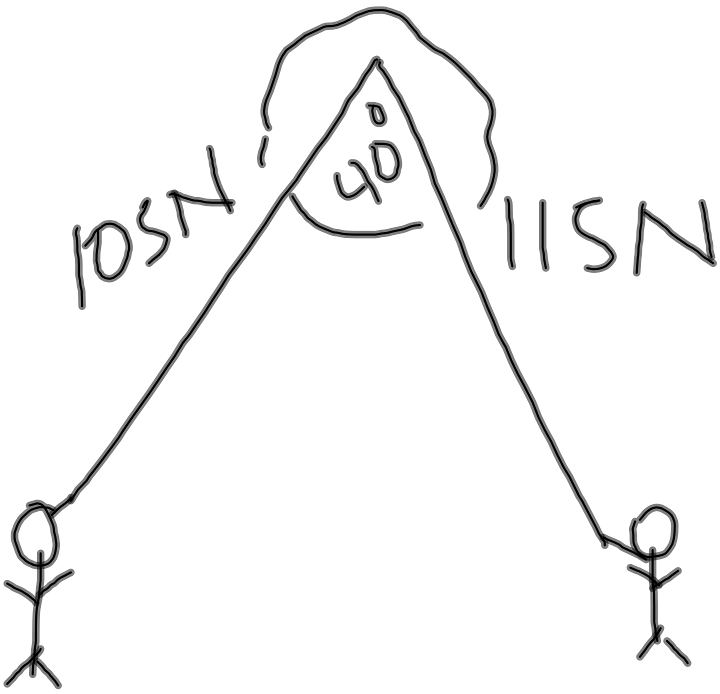
$$\cancel{37.5^2}\cdot\frac{y^2}{\cancel{37.5^2}}=\frac{9}{25}\cdot 37.5^2$$

$$\sqrt{y^2}=\sqrt{506.25}$$

$$y=22.5$$

$$\text{width}=22.5\times 2$$
$$=45\text{ ft}$$

2) $\begin{bmatrix} 90.05 \\ 76.55 \\ 86.55 \end{bmatrix}$



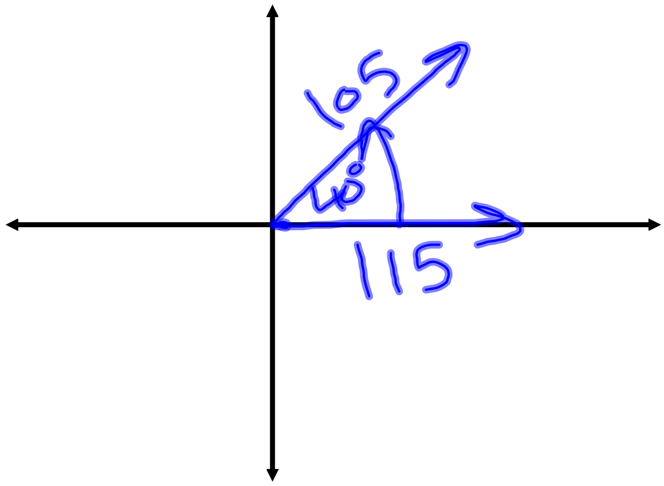
$$\|F\| < 115\cos 0,\ 115\sin 0 >$$

$$\|S\| < 105\cos 40,\ 105\sin 40 >$$

$$\|RF\| = \sqrt{195.4^2 + 67.5^2}$$

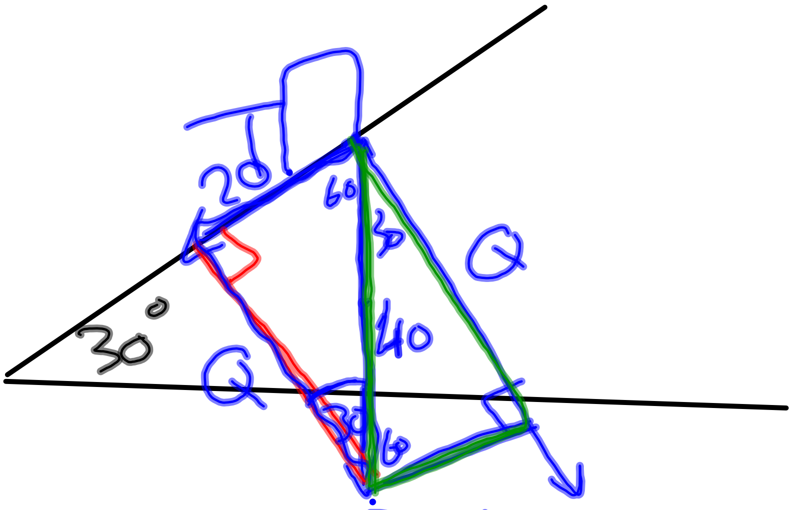
$$= 206.73$$

$$\theta = \frac{67.5}{195.4} = 19.05^0$$



$$F = \langle 115\cos 0, 115\sin 0\rangle$$
$$+ \qquad +$$
$$S = \langle 105\cos 40, 105\sin 40\rangle$$
$$R = \langle 195.4, 67.5\rangle$$
$$\|R\| = \sqrt{195.4^2 + 67.5^2} = 206.73$$
$$\tan^{-1}\theta = \frac{67.5}{195.4} = 19.05°$$

5]



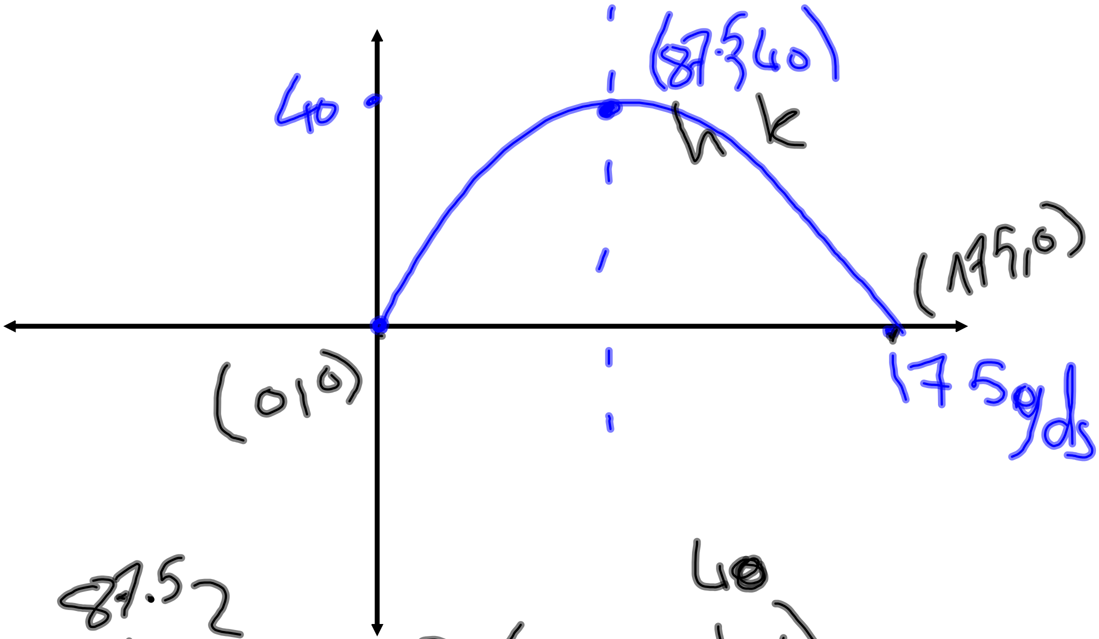
$\sin 30 = \frac{\|T\|}{40}$

$\|T\| = 20$

$\|Q\| = 20\sqrt{3}$

$\sin 60 = \frac{\|Q\|}{40}$

$\|Q\| = 20\sqrt{3}$



$$(x - \overset{87.5}{\cancel{h}})^2 = 4P(y - \overset{40}{\cancel{k}})$$

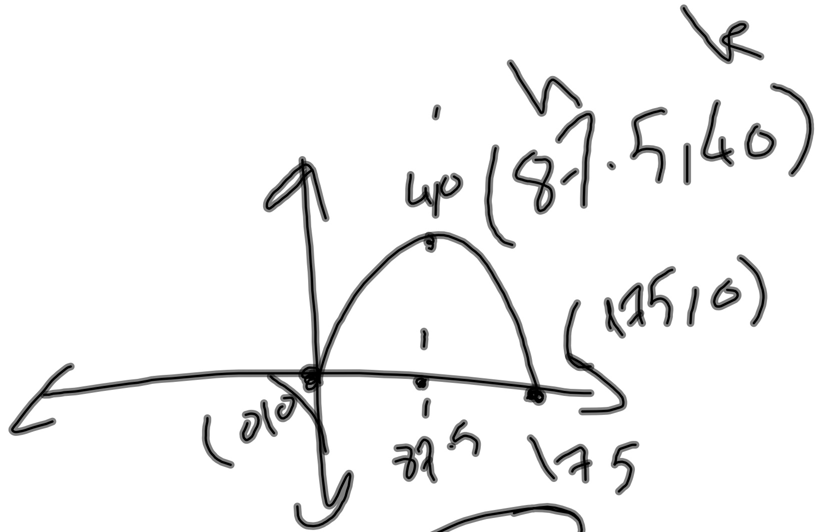
$$(\overset{0}{\cancel{x}} - 87.5)^2 = 4P(\overset{0}{\cancel{y}} - 40)$$

$$(87.5)^2 = 4P(-40)$$

$$P = \frac{(87.5)^2}{4 \cdot -40} = -47.8$$

$$(x - 87.5)^2 = 4 \cdot -47.8 (y - 40)$$

$$(x - 87.5)^2 = -191.4(y - 40)$$



$$(x-87.5)^2 = 4\cancel{P}(y-40)$$

-47.8

$$\frac{(87.5)^2}{4\cdot -40} = \frac{\cancel{4\cdot -40}\cdot P}{\cancel{4\cdot -40}}$$

$$P = -47.8$$

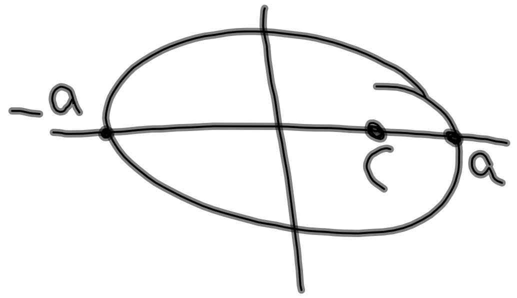
$$\boxed{(x-87.5)^2 = -191.4(y-40)}$$

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

$$a=\frac{477,700}{2}=238850$$

$$b=\frac{476980}{2}=238490$$

a) $$\boxed{\frac{x^2}{(238,850)^2}+\frac{y^2}{(238,490)^2}=1}$$



$c=\sqrt{\ }$

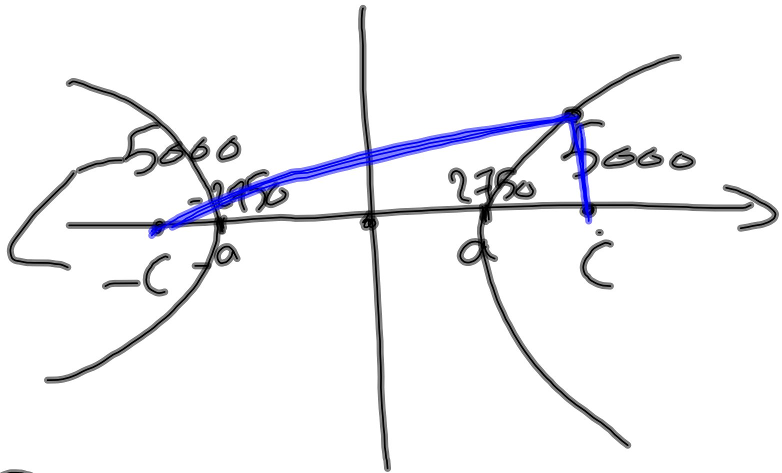
min. dist = a − c

max dist = a + c

$c = 337530.44$

min = 238850 − 337530.4

8)



$C = \pm 5000$

$d = st = 5 \cdot 1100 = 5500\,ft$

$|d_1 - d_2| = 5500$

k

$k = 2a$

$a = \dfrac{5500}{2} = \boxed{2750}$

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

$b^2 = c^2 - a^2 = 5000^2 - 2750^2 = 17437500$

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

$$\frac{x^2}{(2750)^2} - \frac{y^2}{17437500} = 1$$

$630 - 215 = 415$

both

read
630

Sen. 215

$$P(\text{Sen. or readsPPr}) = \frac{840 + 630 - 415}{1560} = \boxed{\frac{211}{312}}$$

$10 \longrightarrow 3$

totalne $_{10}P_3 = 720$

012
123
234
345
456
567
678
789

$$P = \frac{16}{720} = \boxed{\frac{1}{45}}$$

Correction of the Quiz

1)

black	0	1	2
Prob.	9/25	12/25	4/25

$$P(0) = \frac{3}{5} \cdot \frac{3}{5} =$$

$$P(1) \quad \frac{3}{5} \cdot \frac{2}{5} + \frac{2}{5} \cdot \frac{3}{5} =$$

$$P(1b, 1w) = \boxed{\frac{3}{5} \cdot \frac{2}{5}} + \boxed{\frac{2}{5} \cdot \frac{3}{5}}$$

$$P(2) = \frac{2}{5} \cdot \frac{2}{5} = \frac{4}{25}$$

3) $10 \times 10 \times 10 \times 26 \times 26$

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

$4C_0 (x)^4 (2y)^0 - 4C_1 x^3 (2y)^1 + 4C_2 x^2 (2y)^2 - 4C_3 x^1 (2y)^3 + 4C_4 x^0 (2y)^4$

$\boxed{x^4 - 8x^3y + 24x^2y^2 - 32xy^3 + 16y^4}$

6)

Passed
170

$$(P \text{ m or Pas}) = \frac{120+170-80}{300} = 0.7$$

$$\frac{1}{3} \text{ of males } x = \frac{1}{3} \times 120 = 40$$

$$\frac{120+170-80}{300} =$$

$P = \frac{1}{5}$

$q = \frac{4}{5}$

$n = 4$

a) $r = 2$

$nCr\, P^r q^{n-r} =$

$4C_2 \left(\frac{1}{5}\right)^2 \left(\frac{4}{5}\right)^2 = 0.1536$

b) $P(2) + P(3) + P(4)$

$P(3) = 4C_3 \left(\frac{1}{5}\right)^3 \left(\frac{4}{5}\right) = 0.0256$

$P(4) = 4C_4 \left(\frac{1}{5}\right)^4 \cancel{\left(\frac{4}{5}\right)}^0 = 0.0016$

$0.1536 + 0.0256 + 0.0016 =$

$\boxed{0.1808}$

1) Solve the given non-linear System.

$$\cancel{x^2} + y^2 = 144$$
$$\pm \; \cancel{x^2} + 4y^2 = 64$$
$$\overline{\qquad\qquad\qquad\qquad}$$

$$\frac{\cancel{5}y^2}{\cancel{5}} = \frac{80}{5}$$

$$y^2 = 16$$
$$y = \pm 4$$

$$x^2 + 16 = 144 - 16$$
$$x^2 = 128$$
$$x = \pm 8\sqrt{2}$$

Discriminant $b^2 - 4ac$

$-ve$	$=0$	$+ve$
ellipse	Parabola	hyperbola

Tell if the graph of the equation is a hyper. . . -

$ax^2 + bxy + cy^2 + dx + ey + f = 0$

1) $9x^2 + 4y^2 + 54x - 8y + 49 = 0$

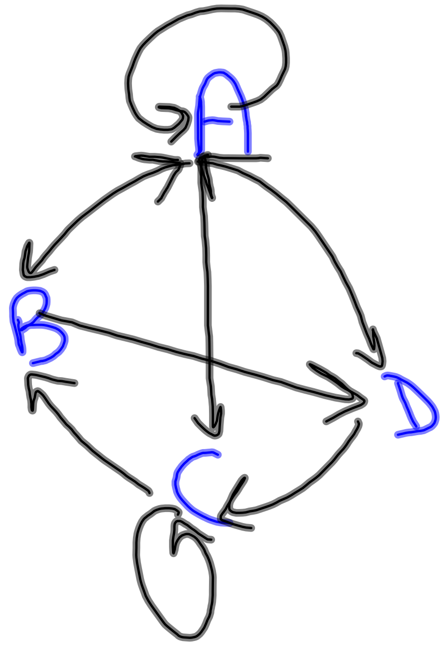
$a = 9, b = 0, c = 4$

$0 - 4 \cdot 4 \cdot 9 = -ve$ $\boxed{\text{ellipse}}$

$0 - 144 = -144$

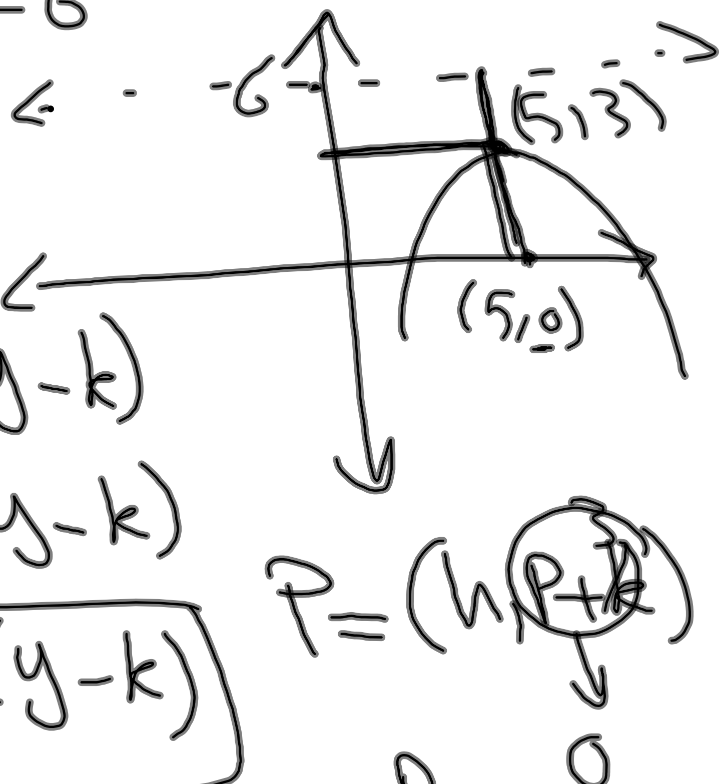
Draw a directed network of the given adajecncy matrix

	A	B	C	D
A	1	1	1	1
B	1	0	0	1
C	0	1	1	0
D	1	0	1	0



Find the equation of.

1) A Parabola with focus (5,0), directrix $y=6$



$\overset{h\ k}{(5,3)}$

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

$(x-5)^2 = 4\overset{-3}{p}(y-k)$

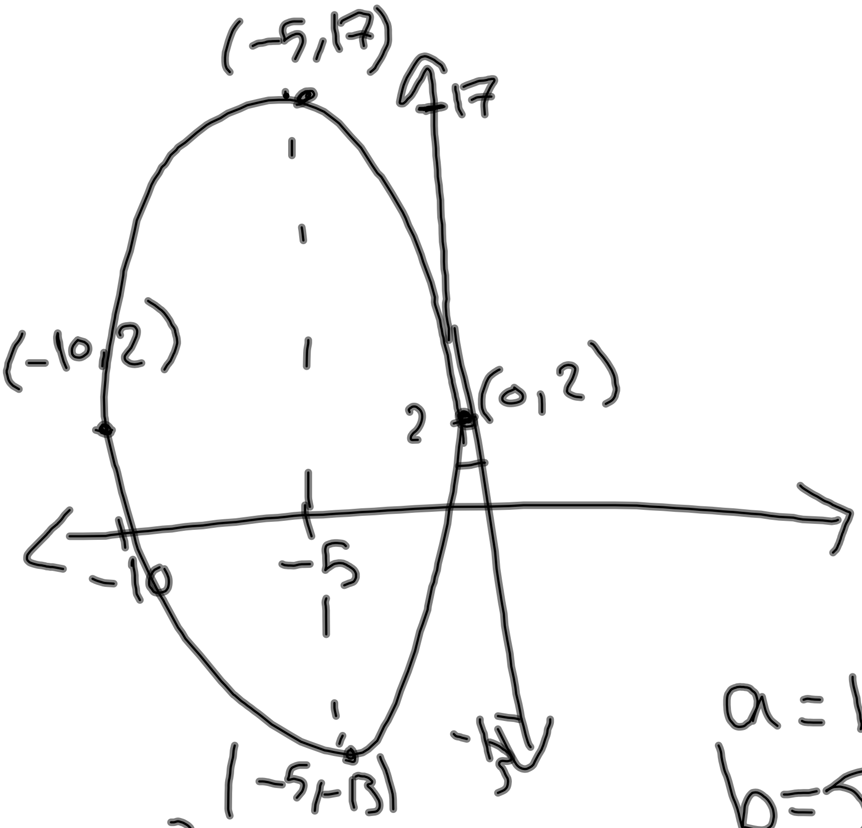
$$\boxed{(x-5)^2 = -12(y-k)}$$

$P = (h, p+k)$

0

$p = -3$

2) An ellipse with center $(-5,2)$ endpoints of both axis are $(0,2)$, $(-5,17)$, $(-10,2)$, $(-5,-13)$



$a=15$
$b=5$

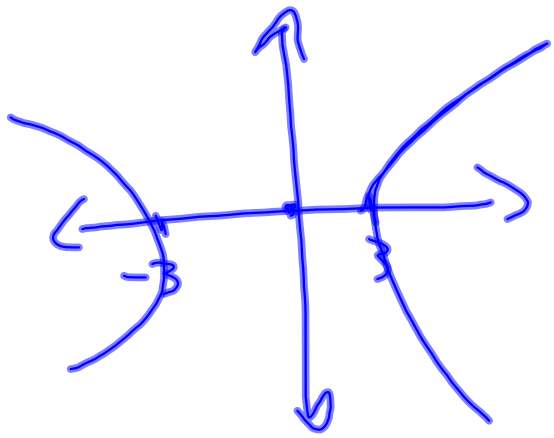
$$\frac{x^2}{b^2}+\frac{y^2}{a^2}=1$$

$$\boxed{\frac{x^2}{25}+\frac{y^2}{225}=1}$$

3] A hyperbola with center (0,0)

x-intercepts $= \pm 3$, asymptotes

$y = \pm \frac{4}{3} x$



$a = 3$

$y = \pm \frac{b}{a} x$

$\frac{4}{\cancel{3}} = \frac{b}{\cancel{a}}$

$b = 4$

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

$$\boxed{\frac{x^2}{9} - \frac{y^2}{16} = 1}$$

Find the vertices, asyptotes, foci of the hyperbola

$$\frac{\cancel{225}x^2}{\cancel{225}} - \frac{36y^2}{225} = \frac{\cancel{225}}{\cancel{225}}$$

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

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

$a = 1$ $\quad (1,0), (-1,0)$

$b = \frac{5}{2}$ $\quad C = \sqrt{a^2+b^2}$

$$= \sqrt{1+\frac{25}{4}} = 2.7$$

foci $(2.7, 0), (-2.7, 0)$

$$y = \pm \frac{b}{a}x$$

$$\boxed{y \pm \frac{5}{2}x}$$

Find the focus and directrix of the Parabola

$$y = -\frac{1}{16}x^2$$

$x^2 = -16y \qquad P = -4$

$4P =$

focus $(0, -4)$

directrix $y = 4$