Pop Quiz 6 - 2206820852 - Juan Maxwell Tanaya

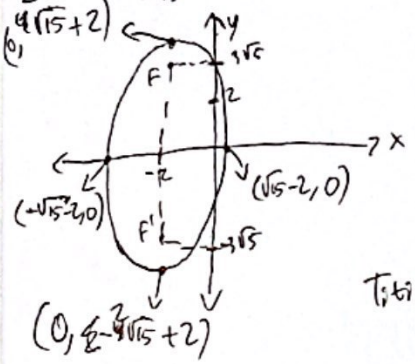
1b. $4x^2+y^2+16x-4y-40=0$

$4(x^2+4x\ \ )+(y^2-4y\ \ )=40$

$4(x^2+4x+4)+(y^2-4y+4)=40+16+4$

$4(x+2)^2+(y-2)^2=60$

$\frac{(x+2)^2}{15}+\frac{(y-2)^2}{60}=1$ → Ellipse Vertical



Titik Pusat = $(-2,2)$

Vertex Mayor = $(0, \frac{4}{2}\sqrt{15}+2)$

dan $(0, -\frac{4}{2}\sqrt{15}+2)$

Vertex Minor = $(\sqrt{15}-2, 0)$

dan $(-\sqrt{15}-2, 0)$

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

$c^2=60-15$

$c^2=45$

$c=3\sqrt{5}$

$(-2, \pm 3\sqrt{5})$

2b. $x^2-16y^2-4x+32y-59=0$

$(x^2-4x\ \ )-16(y^2-2y\ \ )=59$

$(x^2-4x+4)-16(y^2-2y+1)=59+4-16$

$(x-2)^2-16(y-1)^2=47$

$\frac{(x-2)^2}{47}-\frac{16(y-1)^2}{47}=1$

$\frac{(x-2)^2}{47}-\frac{(y-1)^2}{(\frac{47}{16})}=1$ → Hyperbola Horizontal

Titik pusat = $(2,1)$

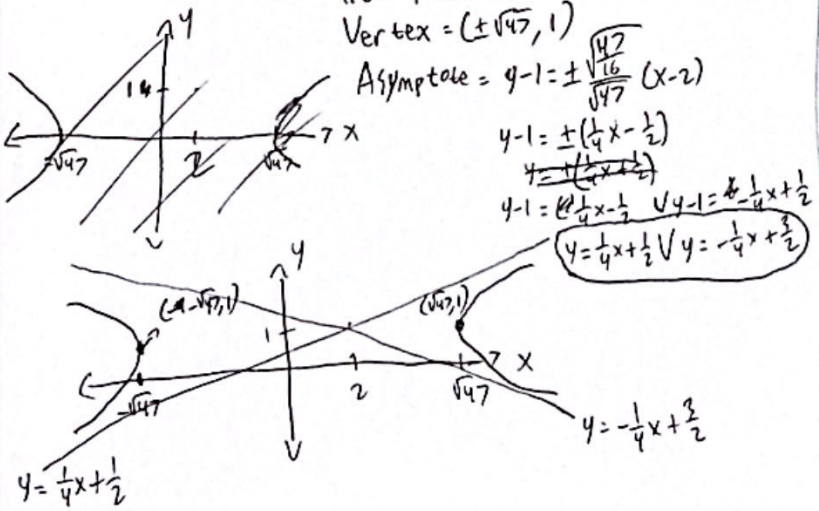
Vertex = $(\pm\sqrt{47}, 1)$

Asymptote = $y-1=\pm\frac{\sqrt{\frac{47}{16}}}{\sqrt{47}}(x-2)$

$y-1=\pm(\frac{1}{4}x-\frac{1}{2})$

$y-1=\frac{1}{4}x-\frac{1}{2}$ ∨ $y-1=-\frac{1}{4}x+\frac{1}{2}$

$y=\frac{1}{4}x+\frac{1}{2}$ ∨ $y=-\frac{1}{4}x+\frac{3}{2}$



3a. $4x^2-7xy=4y^2-5x-15$

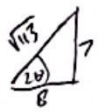
$4x^2-7xy-4y^2+5x+15=0$

$A=4$	$D=5$
$B=-7$	$E=0$
$C=-4$	$F=15$

$\cot 2\theta=\frac{A-C}{B}$

$=\frac{4-(-4)}{-7}$

$\cot 2\theta=-\frac{8}{7}$



4b. $5x^2-8xy+5y^2-17=0$

$A=5$	$D=0$
$B=-8$	$E=0$
$C=5$	$F=-17$

$\cot 2\theta=\frac{A-C}{B}$

$=\frac{0}{-8}$

$\cot 2\theta=0$

$2\theta=90°$

$\theta=45°$

$\cos\theta=\frac{\sqrt{2}}{2}$ → $\cos^2\theta=\frac{1}{2}$

$\sin\theta=\frac{\sqrt{2}}{2}$ → $\sin^2\theta=\frac{1}{2}$

$\begin{pmatrix}A'\\B'\\C'\end{pmatrix}=\begin{pmatrix}\cos^2\theta & \sin\theta\cos\theta & \sin^2\theta\\ 0 & 0 & 0\\ \sin^2\theta & -\sin\theta\cos\theta & \cos^2\theta\end{pmatrix}\begin{pmatrix}A\\B\\C\end{pmatrix}$

$A'=\frac{1}{2}\cdot 5+\frac{1}{2}\cdot -8+\frac{1}{2}\cdot 5$

$=5-4$

$=1$

$C'=\frac{1}{2}\cdot 5+\frac{1}{2}\cdot -8+\frac{1}{2}\cdot 5$

$=5+4$

$=9$

$F'=F$

$u^2+9v^2-17=0$

$u^2+9v^2=17$

$\frac{u^2}{17}+\frac{v^2}{\frac{17}{9}}=17$ → Ellipse Horizontal

Mayor

Vertex = $(\pm\sqrt{17}, 0)$

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

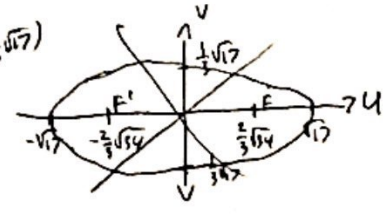
$=17-\frac{17}{9}$

$=\frac{136}{9}$

$c=\sqrt{\frac{136}{9}}$

$c=\frac{2}{3}\sqrt{34}$

Vertex Minor = $(0, \pm\frac{1}{3}\sqrt{17})$



Skets a 4b