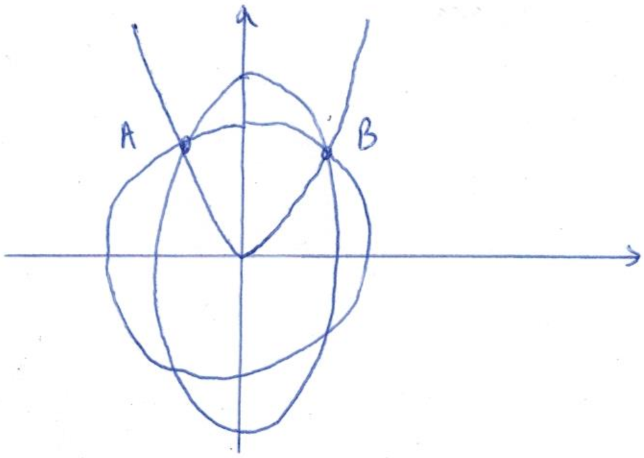
Révision Coniques

#1

$x^2 + y^2 = 61$

$x^2 = 7{,}2y$



Trouvons le pt A

$7{,}2y + y^2 = 61$

$y^2 + 7{,}2y - 61 = 0$

$\frac{-7{,}2 \pm \sqrt{51{,}84 + 244}}{2}$ $y_A = 5$

$y = -12{,}2$ impossible car $12{,}2 > \sqrt{61} = 7{,}81\ldots$ = rayon du cercle

$A(x_A, 5)$ $B(x_B, 5)$ $x = ?$ $x^2 = 7{,}2y$

$x^2 = 7{,}2(5) \Rightarrow x^2 = 36$

$x = \pm\sqrt{36}$

$x = \pm 6$

$A(-6, 5)$

$B(6, 5)$

Ellipse $a = \frac{18}{2} = 9$ $b = ?$

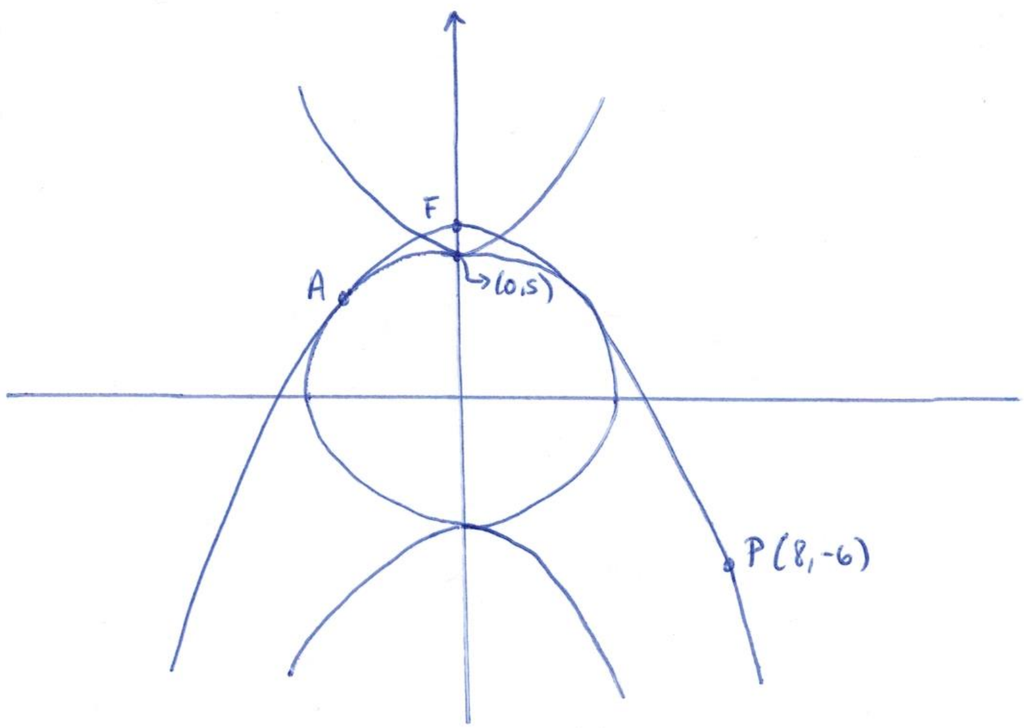
$B(6, 5)$: $\frac{36}{81} + \frac{25}{b^2} = 1 \Rightarrow \frac{25}{b^2} = 0{,}5$

$25 = 0{,}5\, b^2$

$45 = b^2$

$$\frac{x^2}{81} + \frac{y^2}{45} = 1$$

#2



Hyperbole : b = rayon du cercle $= \sqrt{25} = 5$

$F(0,c)$ $\quad c^2 = a^2 + b^2$

$c^2 = 11 + 25 = 36$ $\Big\}$ $F(0,6)$

$c = 6$

Parabole $(x-h)^2 = -4c(y-k)$ $\quad h = 0 \;\; k = 6$

$x^2 = -4c(y-6)$ $\quad (8,-6)$

$64 = -4c(-6-6)$

$64 = -4c(-12)$

$-5,\overline{3} = -4c$

$\Big\}$ $x^2 = -5,\overline{3}(y-6)$

Point A $x_A = ?$ $y_A = ?$ cercle $x^2 + y^2 = 25$

$-5,\overline{3}(y-6) + y^2 = 25$

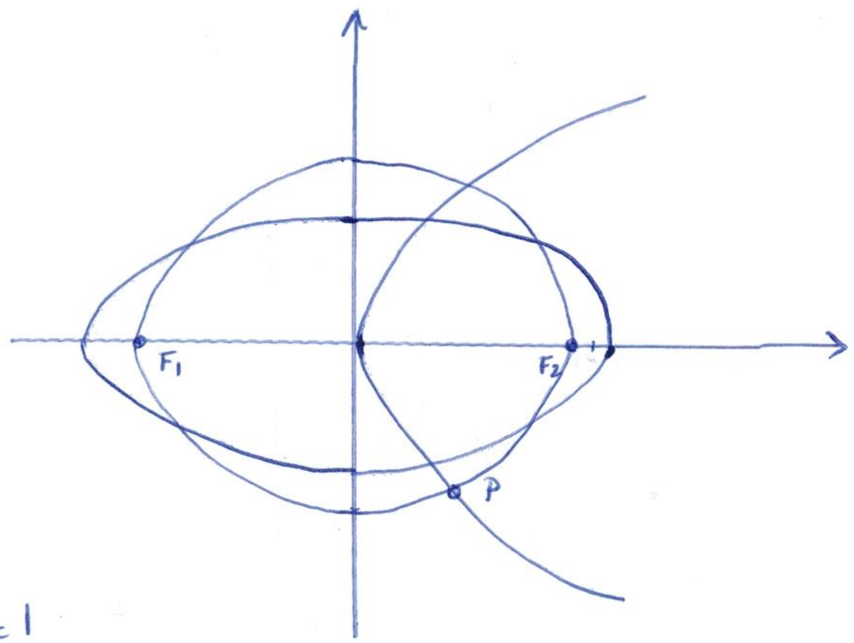
$-5,\overline{3}y + 32 + y^2 = 25$

$y^2 - 5,\overline{3}y + 7 = 0$

$\dfrac{5,\overline{3} \pm \sqrt{28,\overline{4} - 28}}{2}$ $\quad$ $\boxed{y_A = 3}$ $\quad y = 2,\overline{3}$ $\quad x_A = ?$ $\quad x_A + 9 = 25$

$x_A = 4$ $\quad$ $\boxed{A(4,3)}$

#3



Ellipse : $\frac{x^2}{81} + \frac{y^2}{24{,}75} = 1$

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

$81 = 24{,}75 + c^2$

$c = 7{,}5$ = rayon du cercle

Cercle : $x^2 + y^2 = 56{,}25$

Point P coordonnées ? $y^2 = 8x$ et $x^2 + y^2 = 56{,}25$

$x^2 + 8x - 56{,}25 = 0$

$\frac{-8 \pm \sqrt{64 + 225}}{2}$ $\boxed{x = 4{,}5}$ $y = ?$ $y^2 = 8(4{,}5) \Rightarrow y = \pm 6$ donc $y_p = -6$

$x = -12{,}5$

$\boxed{P(4{,}5 ; -6)}$

#4 $b = \frac{24\sqrt{5}}{2} = 12\sqrt{5}$ $a = \frac{96}{2} = 48$

Ellipse : $\frac{x^2}{2304} + \frac{y^2}{720} = 1$

Parabole : $c = \frac{25}{8}$ $y^2 = 4cx$

$y^2 = 12{,}5x$

Point P $\frac{x^2}{2304} + \frac{12{,}5x}{720} = 1$ $\cdot 2304$ $\cdot 2304$

$x^2 + 40x = 2304$

$x^2 + 40x - 2304 = 0$ → $\frac{-40 \pm \sqrt{1600 + 9216}}{2}$ $\boxed{x = 32}$ $y = ?$ $y^2 = 12{,}5 \cdot 32$

$x = -72$ $y = 20$

$\boxed{P(32, 20)}$

#5 $\frac{x^2}{25}+\frac{y^2}{9}=1$ $c=?$ $a^2=b^2+c^2$
$25=9+c^2$ $F(-4,0)$
$4=c$

Parabole passe par $F(-4,0)$ # Foyer de la parabole... $h=0$ $k=2$

$x^2=-4c(y-k)$
$x^2=-4c(y-2)$: $(-4,0)$
$16=-4c(0-2)$
$16=-4c(-2)$
$-8=-4c$

$\boxed{x^2=-8(y-2)}$

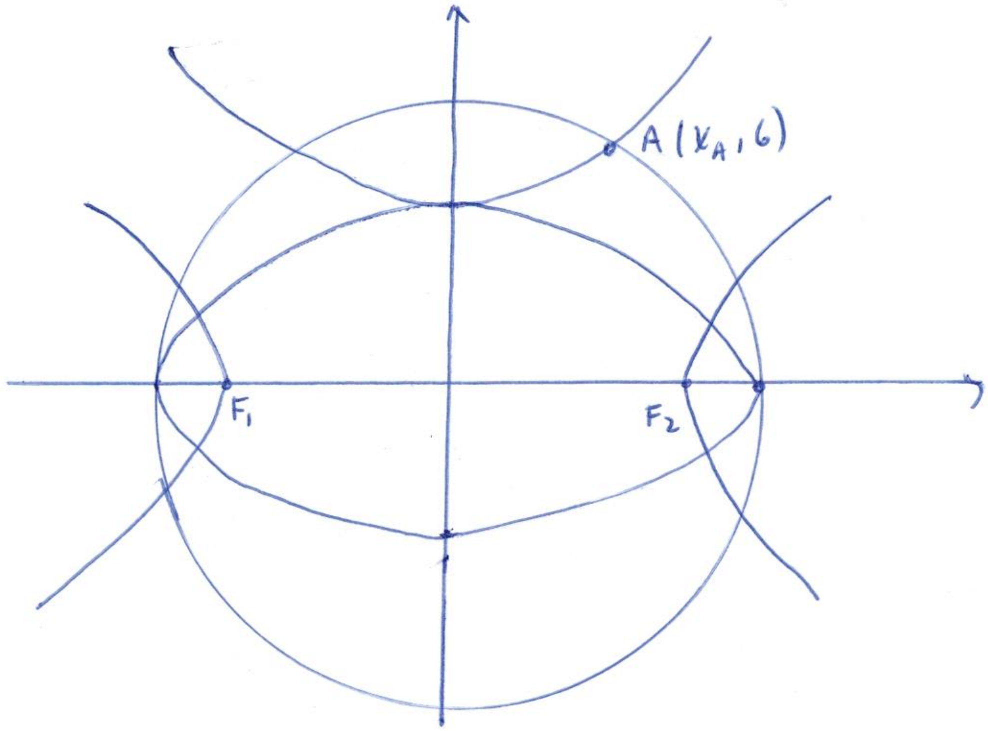
#6 $\frac{x^2}{36}+\frac{y^2}{12{,}96}=1$ $c=?$ $a^2=b^2+c^2$ $A(0,b)$
$36=12{,}96+c^2$ $A(0;3{,}6)$
$4{,}8=c$
$S(4{,}8;0)$

Parabole : $h=4.8$ $k=0$

$y^2=-4c(x-4{,}8)$
$12{,}96=-4c(0-4{,}8)$ $(0;3.6)$
$-2{,}7=-4c$
$0{,}675=c=m\overline{FS}$

$y^2=-2{,}7(x-4{,}8)$ $F(x_S-c,0)$
$\boxed{F(4{,}125;0)}$

#7



Point A $x_A = ?$ si $y_A = 6$ parabole $x^2 = 13,5\,(6 - 4,5)$ $\Big\}$ A (4,5 ; 6)

$x_A = 4,5$

Ellipse : k de la parabole = "b" de l'ellipse = 4,5 = b

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

$4,5^2 + 6^2 = r^2$ A (4,5 ; 6)

$56,25 = r^2 \Rightarrow r = 7,5$ = "a" de l'ellipse

Ellipse : $\dfrac{x^2}{56,25} + \dfrac{y^2}{20,25} = 1$ $a^2 = b^2 + c^2$

$56,25 = 20,25 + c^2$

Hyperbole : $c = 6$ = "a" de l'hyperbole

$\dfrac{x^2}{36} + \dfrac{y^2}{b^2} = 1$ $b = ?$

asymptote $y = -\dfrac{2}{3}x \Rightarrow \dfrac{2}{3} = \dfrac{b}{a} = \dfrac{b}{6} \Rightarrow b = 4$

$$\boxed{\dfrac{x^2}{36} + \dfrac{y^2}{16} = 1}$$