Réponses Cours d'appoint Coniques

Question 1

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

$$(x+3)^2+(y-4)^2=r^2 \ \textit{Remplacer par le point } (-7,6)$$

$$(-7+3)^2+(6-4)^2=r^2$$

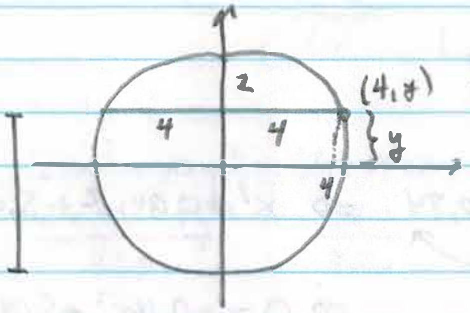
$$(-4)^2+(2)^2=r^2$$

$$16+4=r^2$$

$$20=r^2$$

$$\textit{Réponse}: (x+3)^2+(y-4)^2=20$$

#2



2 moyens

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

$4^2+y^2=r^2$ 2 inconnues

$16+y^2=(y+2)^2 \Rightarrow$ car $r=y+2$

$16+y^2=y^2+4y+4$

$16=4y+4$

$12=4y$ $\qquad r=3+2=5$

$3=y$

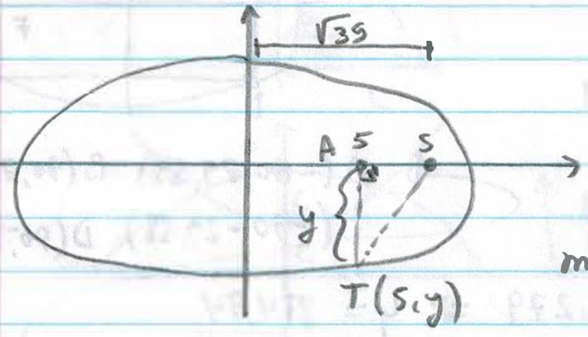
ou thm cordes recontés dans le cercle

$4\times4=2\cdot w$

$8=w$ $\qquad r=\frac{w+2}{2}=\frac{10}{2}=r=5$

#3 $\frac{361x^2+400y^2}{144400}=\frac{144400}{144400}$

$\frac{x^2}{400}+\frac{y^2}{361}=1$ $\qquad \left.\begin{array}{l}a=20\\ b=19\end{array}\right\}$ $a^2=b^2+c^2$ ↳ $c=\sqrt{39}$



Si $x=5$ $y=?$

$\frac{5^2}{400}-\frac{y^2}{361}=1$

$0{,}0625-\frac{y^2}{361}=1$

$-\frac{y^2}{361}=-0{,}9375$

$y^2=338{,}4375$

$y=\pm\sqrt{}=\pm18{,}4$

$y=-18{,}4$

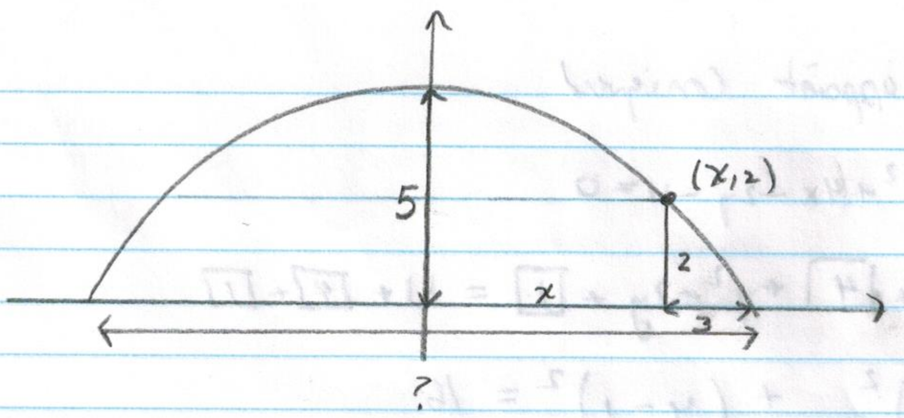
$m\overline{AS}=c-5$

$=\sqrt{39}-5$

$=1{,}24$

$m\overline{TS}=\sqrt{1{,}24^2+(-18{,}4)^2}=\boxed{18{,}44\ u}$

#4



$b = 5$

$a = x + 3$

$pt\ (x,y) = (x,2)$

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

$$\frac{x^2}{(x+3)^2} + \frac{2^2}{5^2} = 1$$

$$\frac{x^2}{x^2+6x+9} + \frac{4}{25} = 1 \Rightarrow \frac{x^2}{x^2+6x+9} = 0{,}84 \Rightarrow x^2 = 0{,}84x^2 + 5{,}04x + 7{,}56$$

$$\Rightarrow 0 = -0{,}16x^2 + 5{,}04x + 7{,}56$$

$$\frac{-5{,}04 \pm \sqrt{25{,}4 - 4(-0{,}16)(7{,}56)}}{-0{,}32}$$ Grosse Bertha

$\oplus\ x = -1{,}43$ $\varnothing$

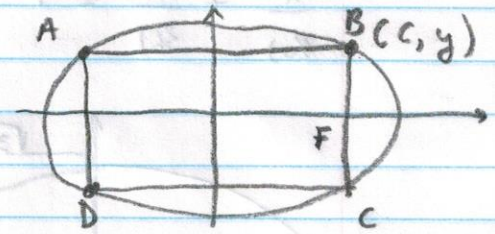
$\ominus\ x = 32{,}93$

donc $x = 32{,}93$

donc $a = 32{,}93 + 3 = 35{,}93 \Rightarrow \boxed{2a = 71{,}87}$

* Note on aurait pu aussi exprimer x en terme de a $\underline{x = a - 3}$

#5 $\left.\begin{matrix} a = 106 \\ b = 56 \end{matrix}\right\}$ $a^2 = b^2 + c^2 \Rightarrow c = 90$



a)

$x = c = 90$ $\quad \frac{90^2}{106^2} + \frac{y^2}{56^2} = 1$

$$0{,}721 + \frac{y^2}{3136} = 1$$

$$\frac{y^2}{3136} = 0{,}279 \Rightarrow y^2 = 874{,}94$$

$$y = \pm\sqrt{874{,}94} = \pm 29{,}58$$

$\Rightarrow A(-90, 29{,}58)$ $B(90, 29{,}58)$

$C(-90, -29{,}58)$ $D(90, -29{,}58)$

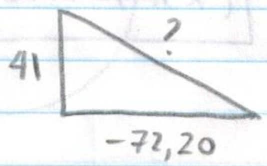
b) $x = ?$ $y = 41$ $\frac{x^2}{11236} + \frac{41^2}{3136} = 1$

$\frac{x^2}{11236} + 0{,}536 = 1$

$\frac{x^2}{11236} = 0.464 \Rightarrow x^2 = 5213{,}13$

$x = \pm\sqrt{\downarrow} = -72{,}20$

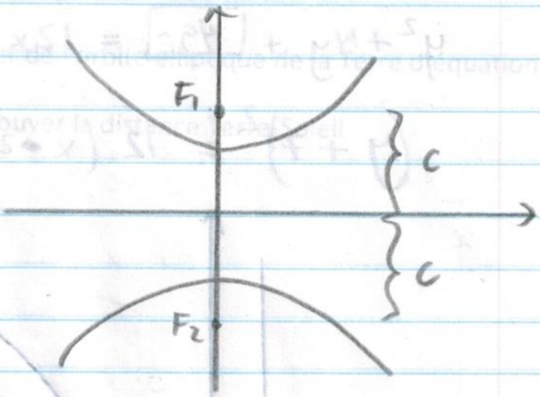
rep :



$\sqrt{41^2 + (-72{,}20)^2} = \boxed{83{,}03\ m}$

#6 $12x^2 - 10y^2 + 360 = 0$

$\frac{12x^2 - 10y^2}{360} = \frac{-360}{360}$



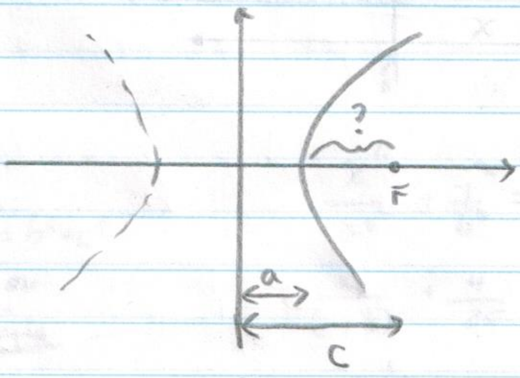
$\frac{x^2}{30} - \frac{y^2}{36} = -1$

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

$c = \sqrt{30 + 36} = \sqrt{66}$

$\boxed{F_1(0, \sqrt{66}) \quad F_2(0, -\sqrt{66})}$

#7



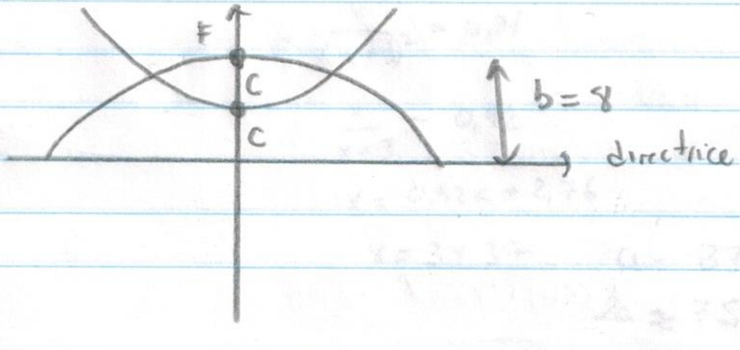
$\frac{x^2}{81} - \frac{y^2}{63} = 1$

$? = c - a$

$c = \sqrt{81 + 63} = 12$

$? = 12 - 9 = \boxed{3}$

#8

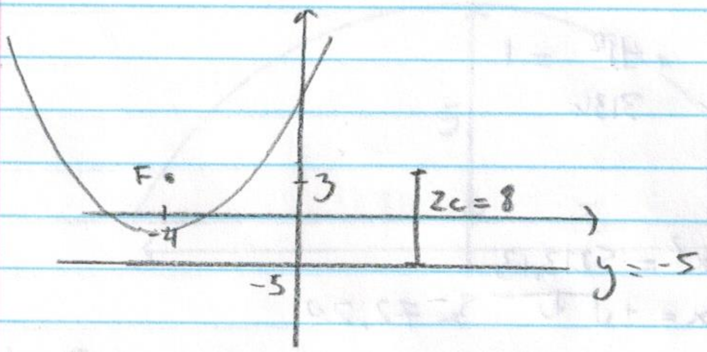


$c = \frac{b}{2} = \frac{8}{2} = 4$

Sommet parabole $= (0,4)$

$\boxed{x^2 = 16(y-4)}$

#9



$2c = 8$

$c = 4$

$h = -4$

$k = 3-4 = -1$

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

$\boxed{(x+4)^2 = 16(y+1)}$

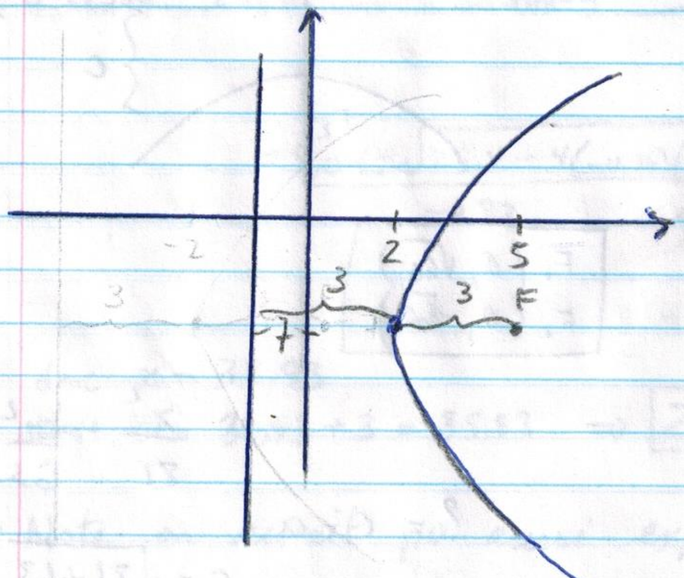
#10 $y^2 - 12x + 14y + 73 = 0$

$y^2 + 14y + \boxed{49} = 12x \overbrace{-73+49}^{-24}$

$(y+7)^2 = 12(x-2)$

$(2,-7) = (h,k)$

$c = 3$

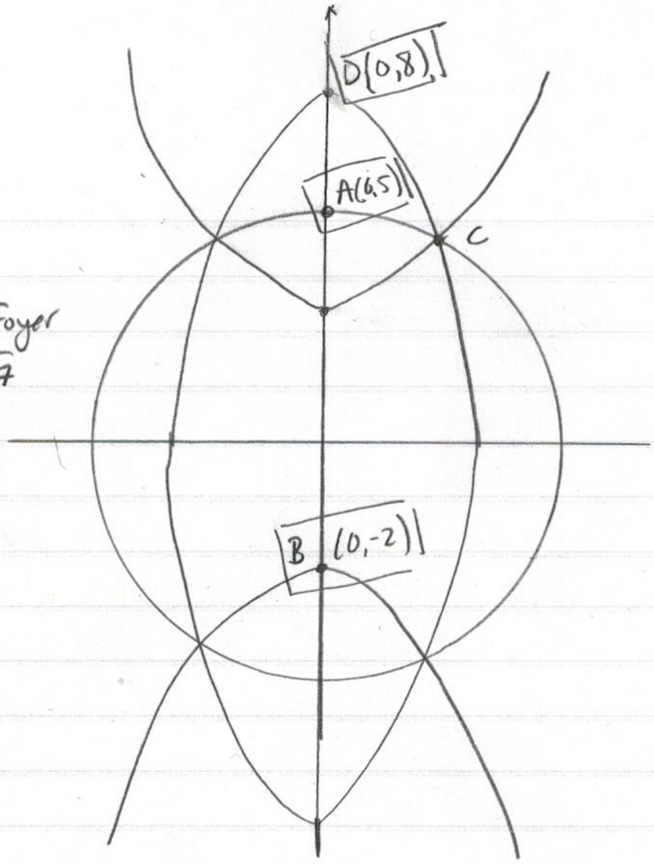


$F(2+3, -7) = \boxed{(5,-7)}$

directrice: $x = 2-3$

$\boxed{x = -1}$

A(0,5)
B(0,-2)
distance entre foyer
hyperbole = $2\sqrt{7}$
D(0,8)



Trouver l'equation de l'ellipse.

1) Cercle : $r = 5 \Rightarrow x^2 + y^2 = 25$

2) Hyperbole $b = 2$

$2C = 2\sqrt{7} \Rightarrow C = \sqrt{7}$

$$\left.\begin{aligned} c^2 &= a^2 + b^2 \\ 7 &= a^2 + 4 \\ 3 &= a^2 \end{aligned}\right\} \quad \frac{x^2}{3} - \frac{y^2}{4} = -1$$

3) Point C : $x^2 + y^2 = 25$ et $\frac{x^2}{3} - \frac{y^2}{4} = -1$

$y^2 = 25 - x^2$

$\frac{x^2}{3} - \frac{(25 - x^2)}{4} = -1$ substitution!

$\frac{4x^2}{12} - \frac{3(25 - x^2)}{12} = -1$ m dénominateur.

$\frac{4x^2 + 3x^2 - 75}{12} = -1$

$7x^2 - 75 = -12$

$7x^2 = 63$

$x^2 = 9$

$x = \pm 3 \Rightarrow \boxed{x_c = 3}$

$y^2 = 25 - 3^2$

$y_c = 4$

$\boxed{C(3,4)}$

4) Ellipse

$\frac{x^2}{a^2} + \frac{y^2}{64} = 1$ $b = 8$

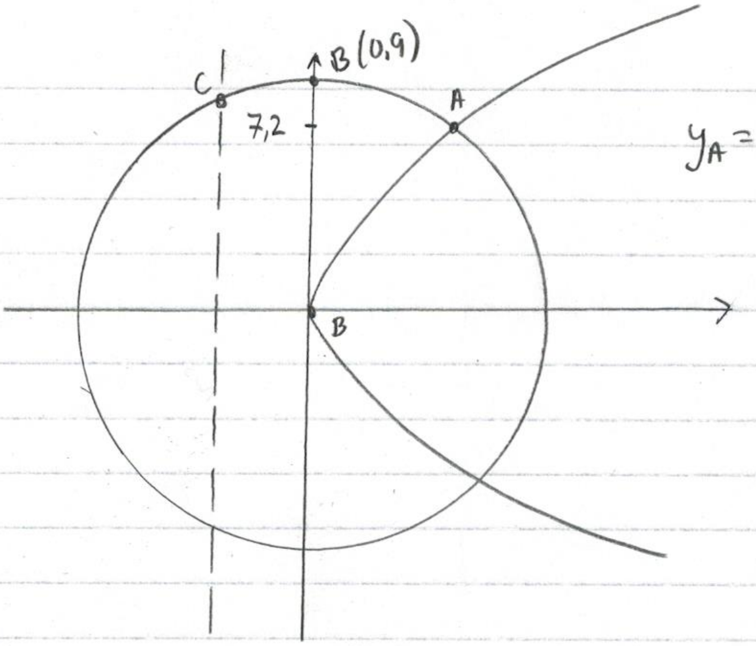
$\frac{9}{a^2} + \frac{16}{64} = 1 \Leftarrow C(3,4)$

$\frac{9}{a^2} = 0{,}75$

$9 = 0{,}75a^2$

$12 = a^2$

$$\boxed{\frac{x^2}{12} + \frac{y^2}{64} = 1}$$



Trouver les coordonnées du point C.

1) Cercle $r = 9 \Rightarrow x^2 + y^2 = 81$

2) point A $x_A = ?$ si $y_A = 7,2 \Rightarrow x^2 + 7,2^2 = 81$

$\boxed{x = 5,4}$

3) Parabole $y^2 = 4cx \leftarrow A(5,4,\ 7,2)$

$7,2^2 = 4c(5,4)$

$2,4 = c$

4) Point C $x_C = -2,4$ $y_C = ?$

CERCLE : $(-2,4)^2 + y^2 = 81$ (règle cercle)

$y = \pm\sqrt{75,24}$

$y_C = 8,67$

$C(-2,4;\ 8,67)$