Mechants bons problèmes : LES CONIQUES

#1 a) $C(-7,5)$ $r=4$ b) $C(3,-1)$ $r=5$

c) $x^2+4x+y^2-6y=16$

$x^2+4x+\underline{4}+y^2-6y+\underline{9}=16+4+9$

$(x+2)^2+(y-3)^2=29$

$C(-2,3)$ $r=\sqrt{29}=5,385....$

d) $x^2+y^2-2x+1=0$

$x^2-2x+\underline{1}+y^2=-1+\underline{1}$

$(x-1)^2+y^2=0$

$C(1,0)$ $r=0$

#2 $C(-1,2)$ $r=3$ $(x+1)^2+(y-2)^2=9$

#3 $h=6$ $k=1$

$(x-6)^2+(y-1)^2=r^2 \leftarrow (-2,-2)$

$(-2-6)^2+(-2-1)^2=r^2$

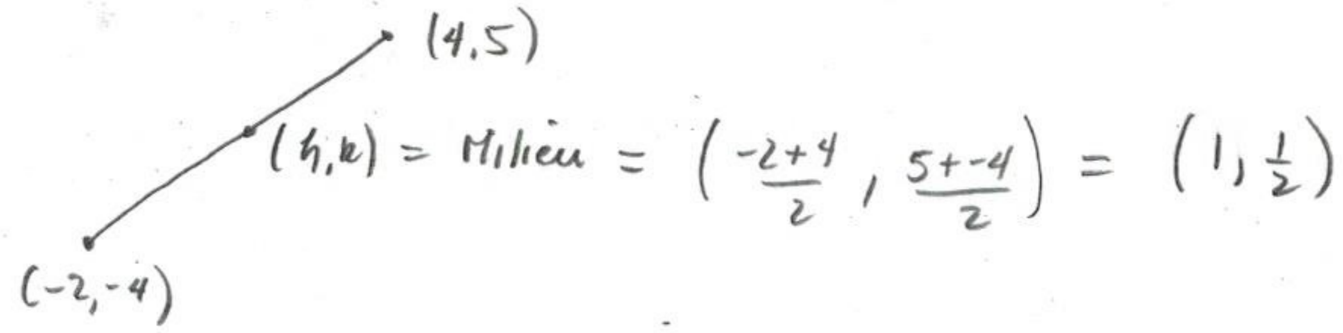
$(-8)^2+(-3)^2=r^2$

$64+9=r^2$

$73=r^2$

$\Rightarrow (x-6)^2+(y-1)^2=73$

#4



$(x-1)^2+(y-\frac{1}{2})^2=r^2 \leftarrow (4,5)$

$(4-1)^2+(5-\frac{1}{2})^2=r^2$

$9.+20,25=r^2$

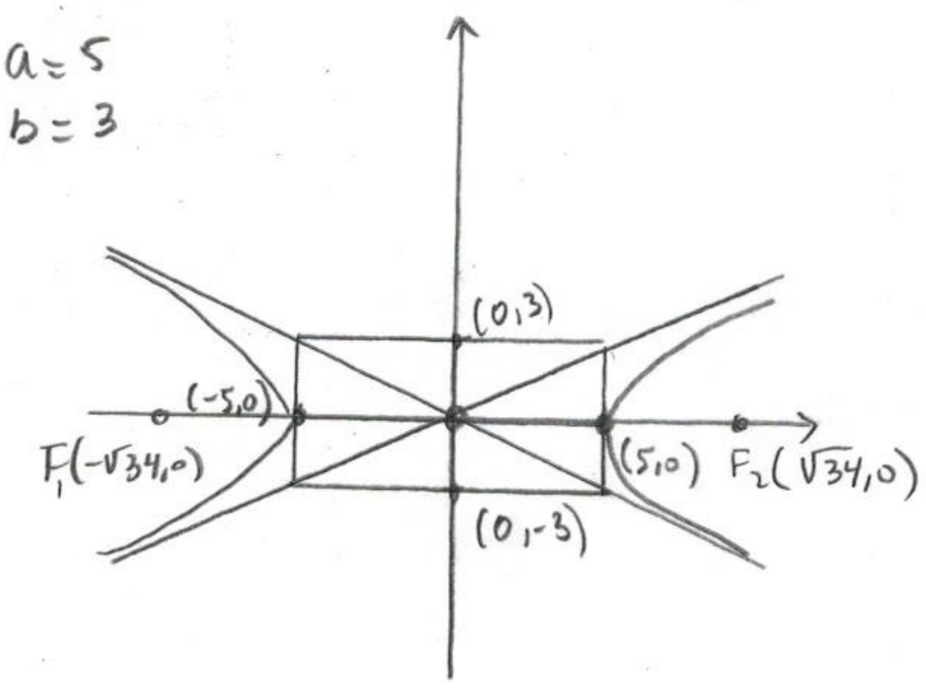
$29,25=r^2$

$\boxed{(x-1)^2+(y-\frac{1}{2})^2=29,25}$

#5 a) $\frac{x^2}{25}-\frac{y^2}{9}=1$

$a=5$

$b=3$

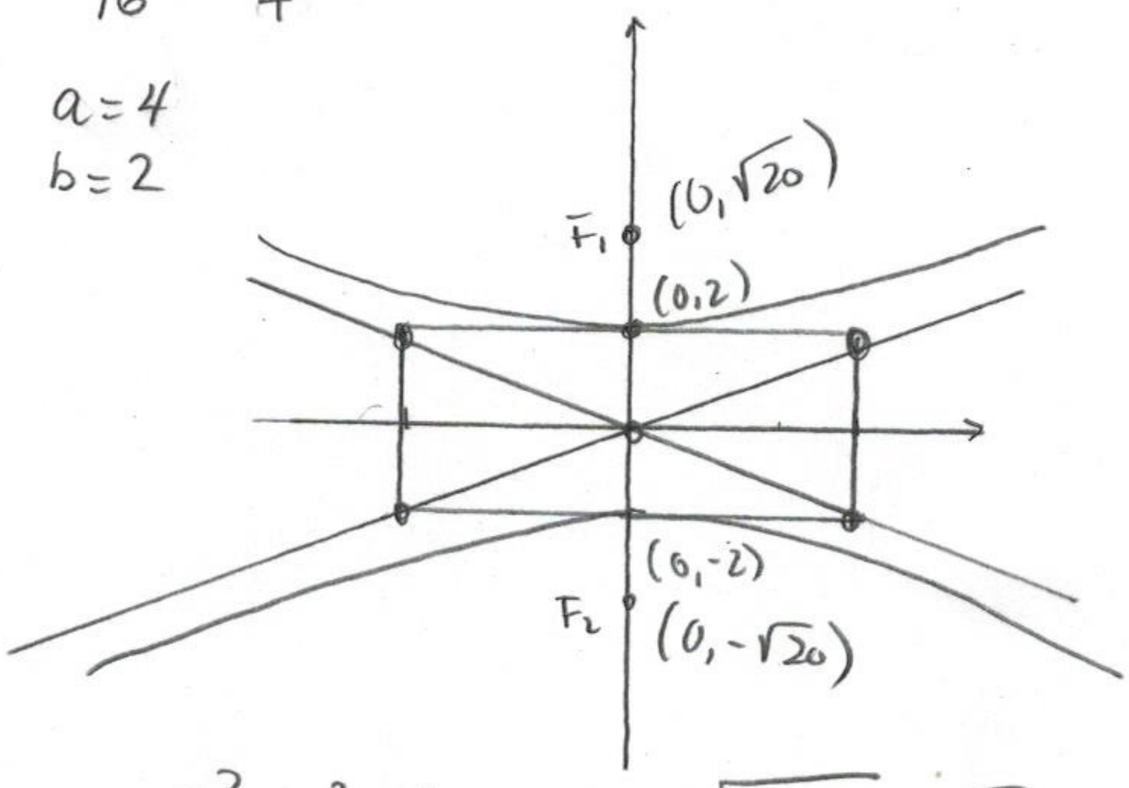


$c^2=a^2+b^2 \Rightarrow c=\sqrt{25+9}=\sqrt{34}$

b) $\frac{x^2}{16}-\frac{y^2}{4}=-1$

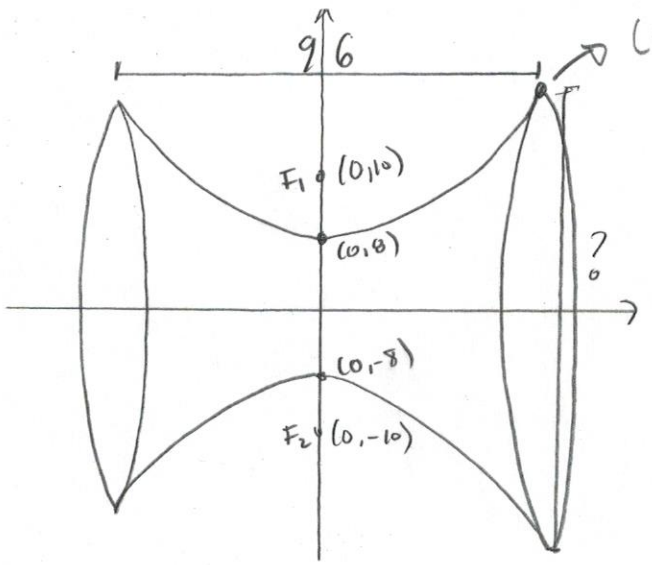
$a=4$

$b=2$



$c^2=a^2+b^2 \Rightarrow c=\sqrt{16+4}=\sqrt{20}$

#6



$b = 8$

$c = 10$

$a = ? \Rightarrow c^2 = a^2 + b^2$

$100 = a^2 + 64$

$a = 6$

$\frac{x^2}{36} - \frac{y^2}{64} = -1 \leftarrow (48, y)$

$\frac{48^2}{36} - \frac{y^2}{64} = -1$

$64 - \frac{y^2}{64} = -1$

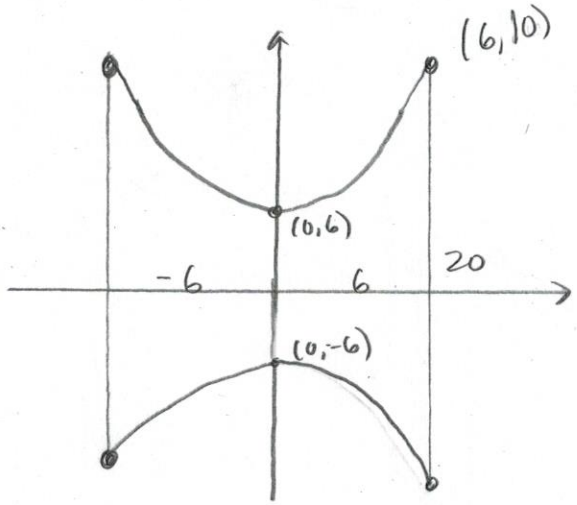
$-\frac{y^2}{64} = -65$

$-y^2 = -4160$

$y^2 = 4160 \Rightarrow y = \pm\sqrt{4160} = \pm 64{,}5$

rep: $64{,}5 \times 2 = 129\,cm$

#7



$\frac{x^2}{a^2} - \frac{y^2}{b^2} = -1 \quad b = 6 \quad x = 6 \quad y = 10$

$\frac{6^2}{a^2} - \frac{10^2}{36} = -1$

$\frac{36}{a^2} - \frac{100}{36} = -1$

$\frac{36}{a^2} - 2{,}\overline{7} = -1$

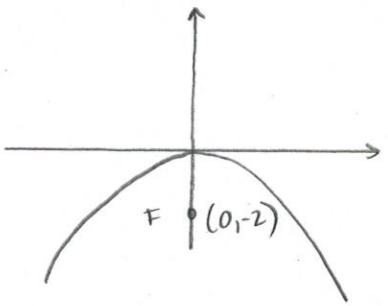
$\frac{36}{a^2} = 1{,}\overline{7} \Rightarrow 36 = 1{,}\overline{7}\,a^2$

$2025 = a^2$

$$\boxed{\frac{x^2}{2025} - \frac{y^2}{36} = -1}$$

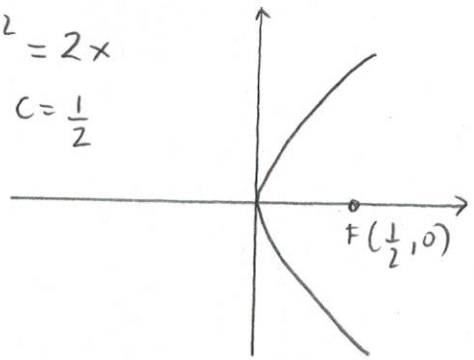
#8 a) $x^2 = -8y$

$c = 2$



b) $y^2 = 2x$

$c = \frac{1}{2}$



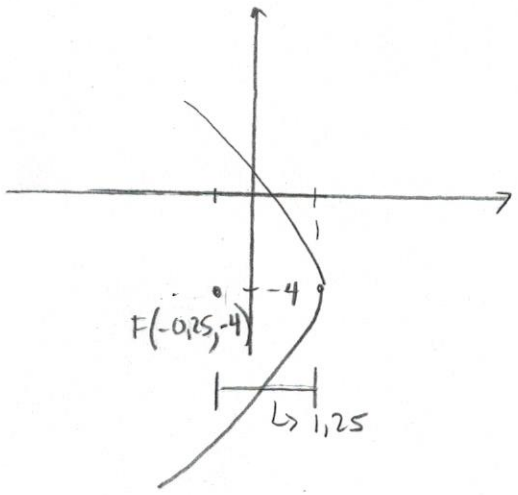
c) $(y+4)^2 = -5x+5$

$(y+4)^2 = -5(x-1)$

$h = 1$

$k = -4$

$c = \frac{5}{4} = 1{,}25$



#9 a) $y^2 = -4cx$

$\boxed{y^2 = -10x}$

$c = 2{,}5$

b) $x^2 = -4cy$

$\boxed{x^2 = -20y}$

$c = 5$

#10 a) $h = -2 \quad k = 4 \quad c = 4$

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

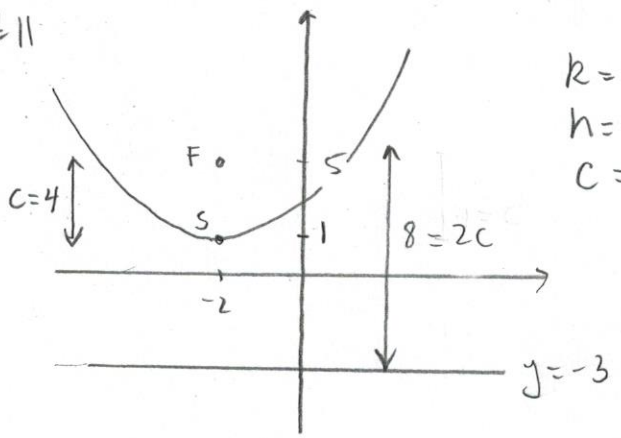
$\boxed{(x+2)^2 = -16(y-4)}$

b) $h = -6 \quad k = 2 \quad c = 2$

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

$\boxed{(y-2)^2 = 8(x+6)}$

#11



$k = 1$

$h = -2$

$c = 4$

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

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

#12 $x^2 - 6x - 8y + 1 = 0$

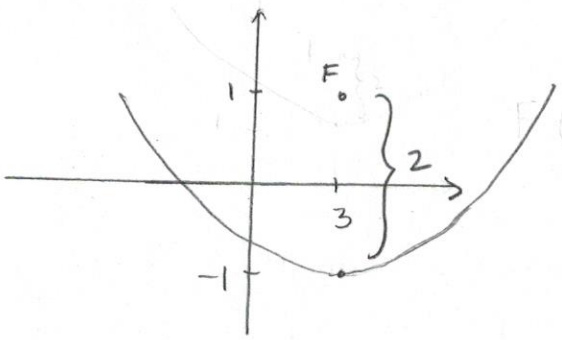
$x^2 - 6x + \underline{9} = 8y - 1 + \underline{9}$

$(x-3)^2 = 8y + 8$

$(x-3)^2 = 8(y+1)$

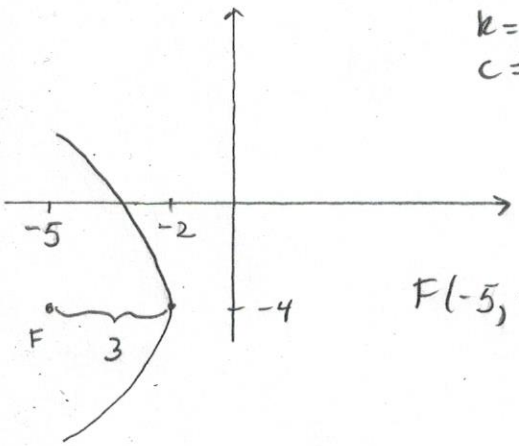
$c = 2$

$h = 3 \quad k = -1$



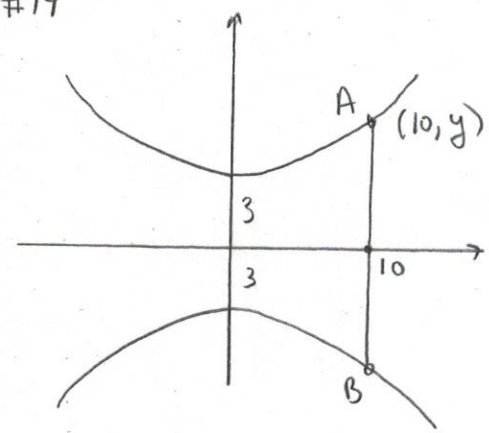
$F(3, 1)$

#13 $(y+4)^2 = -12(x+2)$ $\quad h = -2$, $k = -4$, $c = 3$



$F(-5, -4)$

#14



$b = 3$

$2c = 18$

$c = 9$

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

$81 = a^2 + 9$

$72 = a^2$

$\frac{x^2}{72} - \frac{y^2}{9} = -1 \leftarrow (10, y)$

$\frac{10^2}{72} - \frac{y^2}{9} = -1$

$1,3\bar{8} - \frac{y^2}{9} = -1$

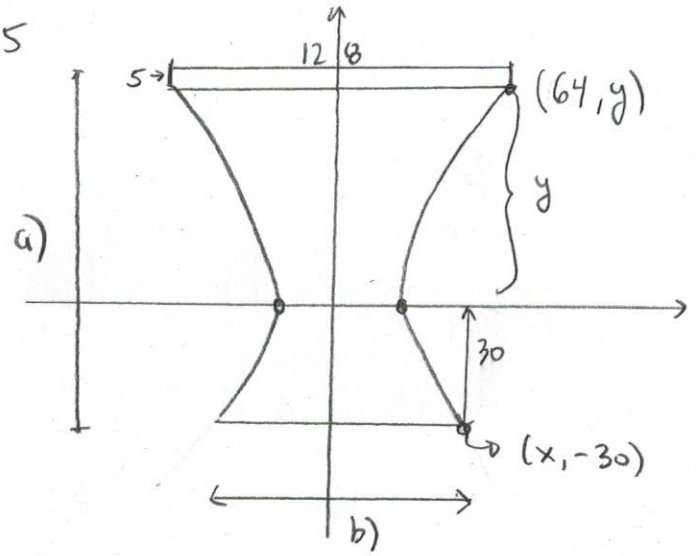
$-\frac{y^2}{9} = -2,3\bar{8}$

$y^2 = 21,5$

$y = \pm\sqrt{21,5} = \pm 4,64$

rep $m\overline{AB} = 2 \times 4,64 = 9,28cm$

#15



$$\frac{64^2}{225} - \frac{y^2}{144} = 1$$

$$18{,}2 - \frac{y^2}{144} = 1$$

$$\frac{-y^2}{144} = -17{,}2$$

$$y^2 = 2477{,}44$$

$$y = \pm\sqrt{2477{,}44}$$

$$y = \pm 49{,}77$$

a) $5 + 49{,}77 + 30 = 84{,}77$ cm

b) $(x, -30) \rightarrow \frac{x^2}{225} - \frac{(-30)^2}{144} = 1$

$$\frac{x^2}{225} - 6{,}25 = 1$$

$$\frac{x^2}{225} = 7{,}25$$

$$x^2 = 1631{,}25$$

$$x = \pm\sqrt{1631{,}25}$$

$x = 40;39$ donc rép : $40{,}39 \times 2 = 80{,}78$ cm

#16a) $x^2 + y^2 - 10x + 4y - 13 = 0$

$$x^2 - 10x + \underline{25} + y^2 + 4y + \underline{4} = 13 + 25 + 4$$

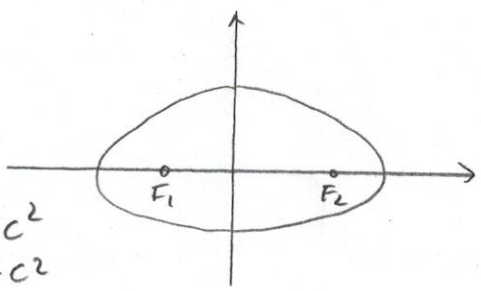
$$(x-5)^2 + (y+2)^2 = 42$$

CENTRE : $\underline{(5, -2)}$ $r = \sqrt{42} = \underline{6{,}48}$

b) $5x^2 + 8y^2 - 80 = 0$

$$\frac{5x^2 + 8y^2}{80} = \frac{80}{80}$$

$$\frac{x^2}{16} + \frac{y^2}{10} = 1$$



$F_1 : (\sqrt{6}, 0)$

$F_2 : (-\sqrt{6}, 0)$

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

$16 = 10 + c^2$

$6 = c^2$

$c = \sqrt{6}$

#16 c) $y^2+6x-6y-21=0$

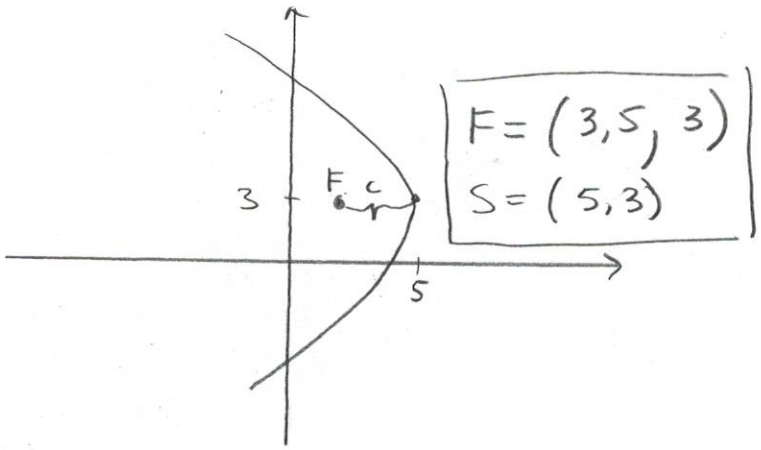
$y^2-6y+\underline{9} = -6x+21+\underline{9}$

$(y-3)^2 = -6x+30$

$(y-3)^2 = -6(x-5)$

$h=5 \quad k=3$

$c=1{,}5$



$F=(3{,}5,\ 3)$

$S=(5,3)$

d) $-3x^2+6y^2+54=0$

$\frac{-3x^2+6y^2}{-54} = \frac{-54}{-54}$

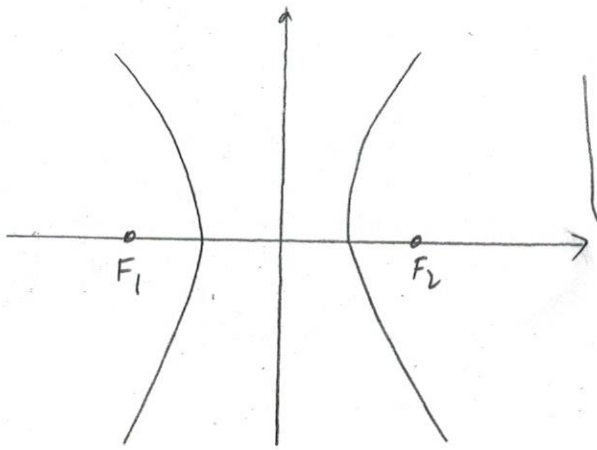
$\frac{x^2}{18} - \frac{y^2}{9} = 1$

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

$c^2=18+9$

$c^2=27$

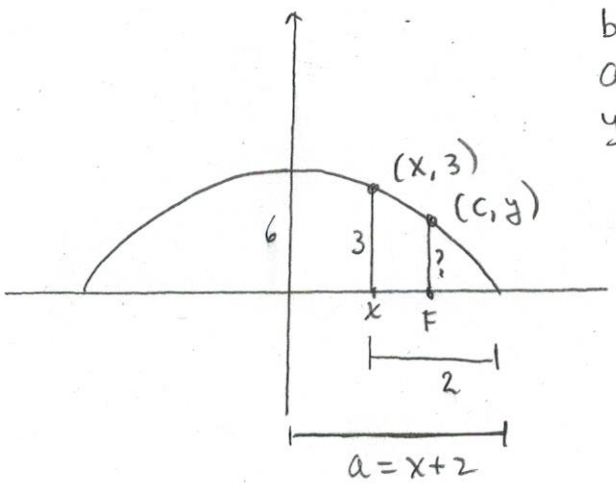
$c=\sqrt{27}$



$F_1(-\sqrt{27},0)$

$F_2(\sqrt{27},0)$

#17



$b=6$

$a=x+2$

$y=3$

$\frac{x^2}{(x+2)^2} + \frac{3^2}{6^2} = 1$

$\frac{x^2}{x^2+4x+4} + \frac{9}{36} = 1$

$\frac{x^2}{x^2+4x+4} + 0{,}25 = 1$

$\frac{x^2}{x^2+4x+4} = 0{,}75$

$x^2 = 0{,}75x^2+3x+3$

$0 = -0{,}25x^2+3x+3$

$\frac{-3\pm\sqrt{9+3}}{-0{,}5}$

$x_1 = -0{,}93$

$x_2 = 12{,}93$

#17 suite donc $a = 12,93 + 2 = 14,93$

Trouvons "c" par $a^2 = b^2 + c^2$

$14,93^2 = 36 + c^2 \Rightarrow c = 13,67$

$x_F = 13,67$ donc $y = ?$

$$\frac{13,67^2}{14,93^2} + \frac{y^2}{36} = 1$$

$$0,83 + \frac{y^2}{36} = 1$$

$$\frac{y^2}{36} = 0,17$$

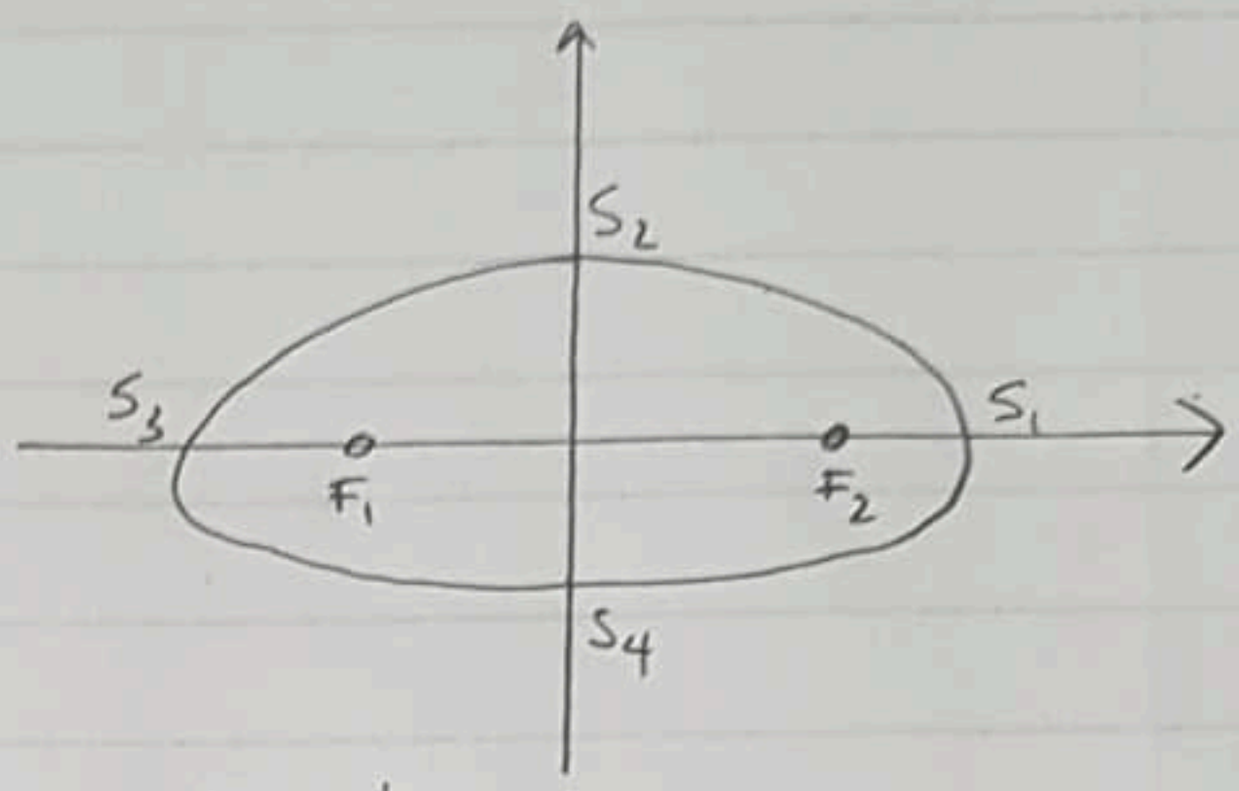
$$y^2 = 6,12$$

$$y = \pm\sqrt{6,12} = \pm 2,47$$ rép : **2,47 u**

#18 $4x^2 + 16y^2 - 64 = 0$

$$\frac{4x^2 + 16y^2}{64} = \frac{64}{64}$$

$$\frac{x^2}{16} + \frac{y^2}{4} = 1$$



$S_1(4,0)$ $S_2(0,2)$ $S_3(-4,0)$ $S_4(0,-2)$

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

$16 = 4 + c^2$ $F_1(-\sqrt{12},0)$ $F_2(\sqrt{12},0)$

$c = \sqrt{12}$