

Méchants bons problèmes : Les CONIQUES

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

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

$$x^2 + 4x + 4 + y^2 - 6y + 9 = 16 + 4 + 9$$

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

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

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

$$x^2 - 2x + 1 + y^2 = -1 + 1$$

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

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

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

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

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

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

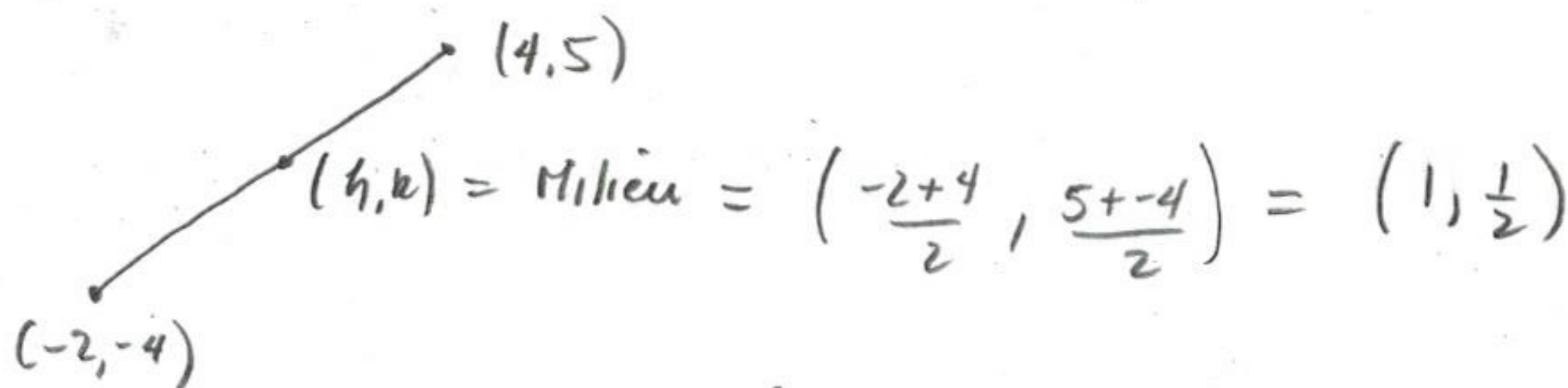
$$(-8)^2 + (-3)^2 = r^2$$

$$64 + 9 = r^2$$

$$73 = r^2$$

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

#4



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

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

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

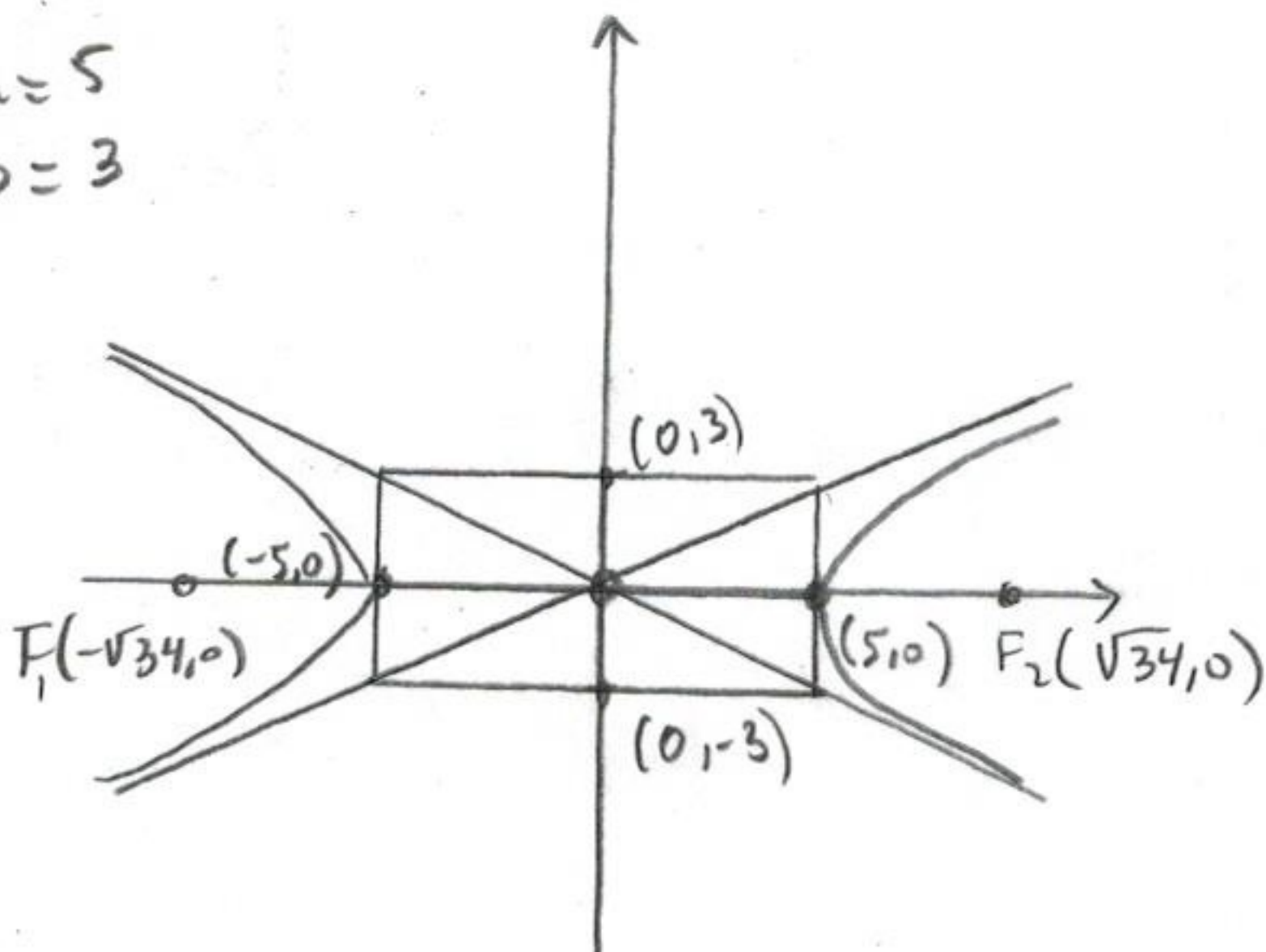
$$29,25 = r^2$$

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

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

$$a=5$$

$$b=3$$

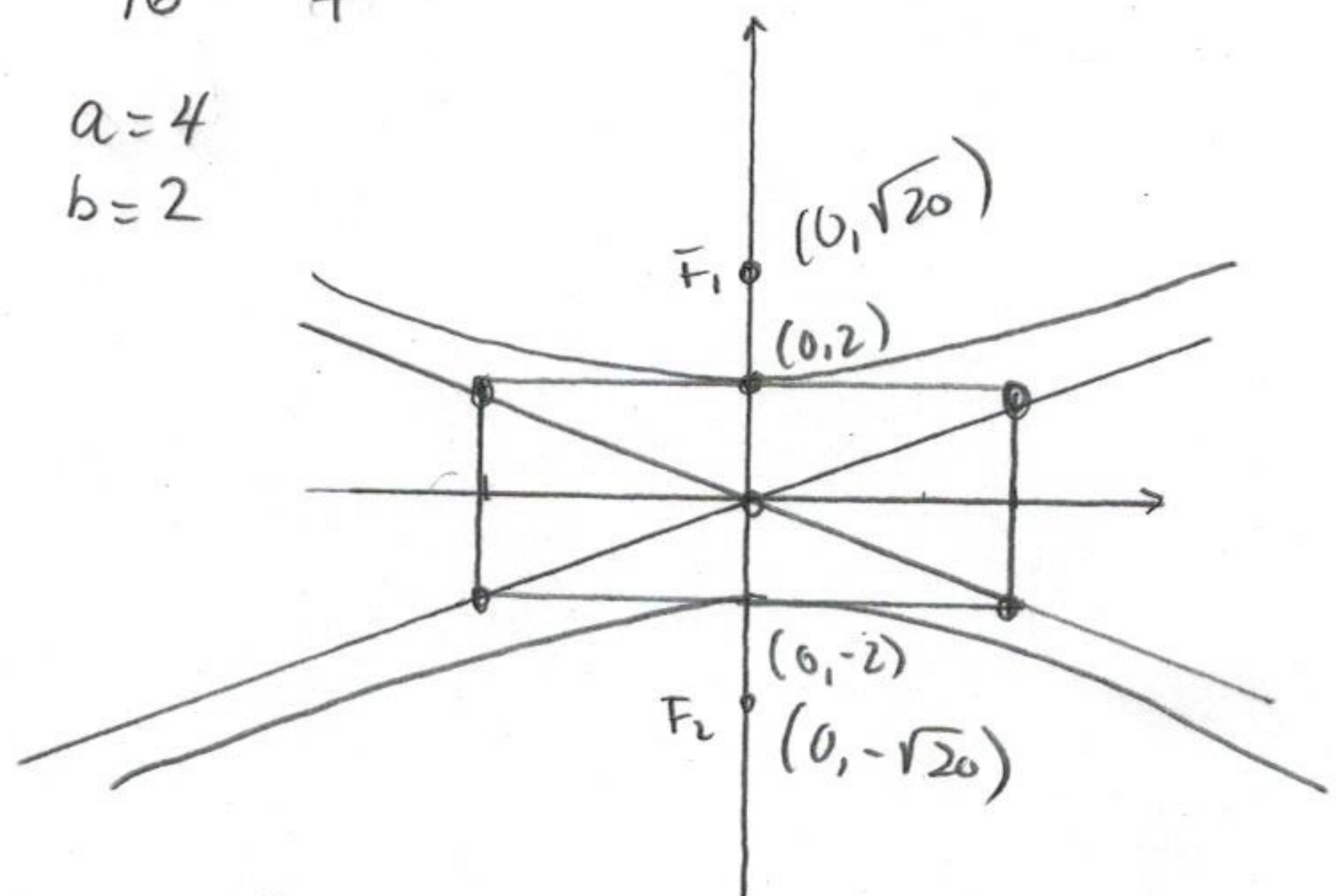


$$c^2 = a^2 + b^2 \Rightarrow c = \sqrt{25 + 9} = \sqrt{34}$$

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

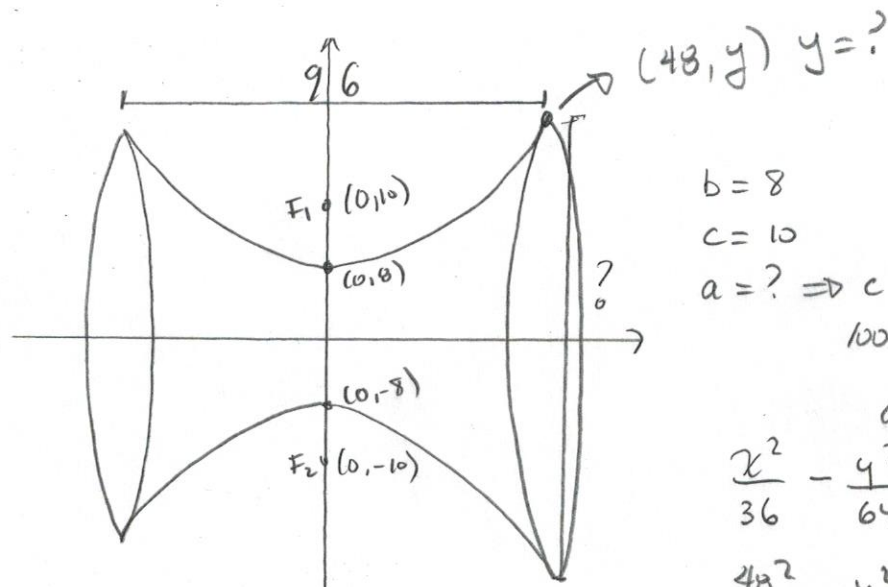
$$a=4$$

$$b=2$$



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

#6



$$b = 8$$

$$c = 10$$

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

$$100 = a^2 + 64$$

$$\downarrow$$

$$a = 6$$

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

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

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

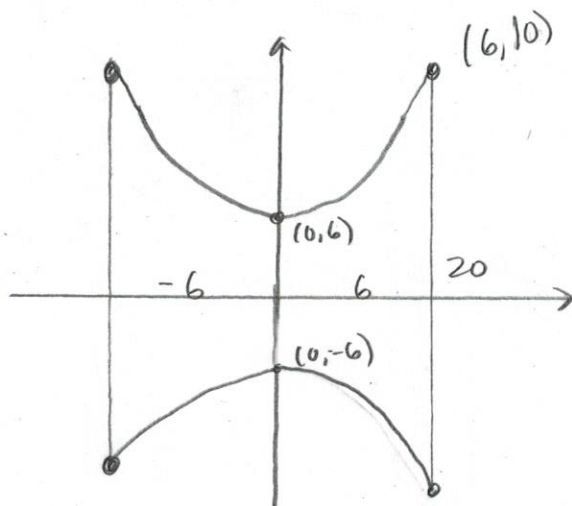
$$-\frac{y^2}{64} = -65$$

$$-y^2 = -4160$$

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

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

#7



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

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

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

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

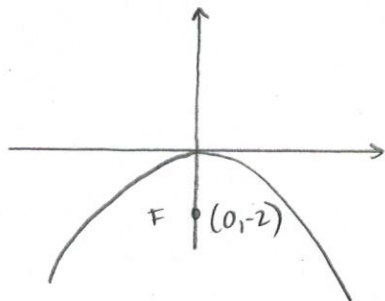
$$\frac{36}{a^2} = 1,7 \Rightarrow 36 = 1,7 a^2$$

$$20,25 = a^2$$

$$\boxed{\frac{x^2}{20,25} - \frac{y^2}{36} = -1}$$

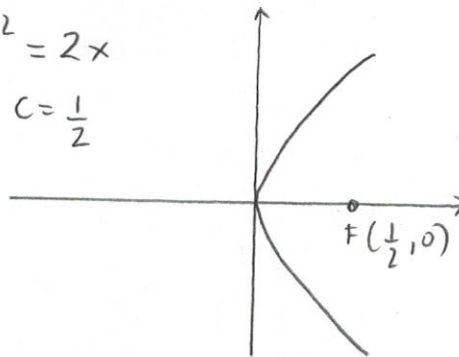
#8 a) $x^2 = -8y$

$c = 2$



b) $y^2 = 2x$

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



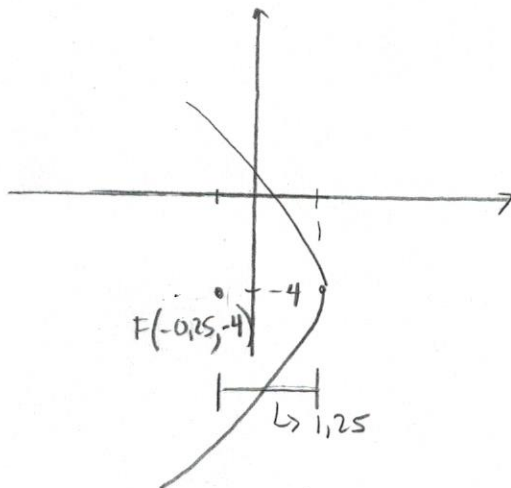
c) $(y+4)^2 = -5x+5$

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

$h = 1$

$k = -4$

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



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

$y^2 = -10x$

$c = 2,5$

b) $x^2 = -4cy$

$x^2 = -20y$

$c = 5$

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

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

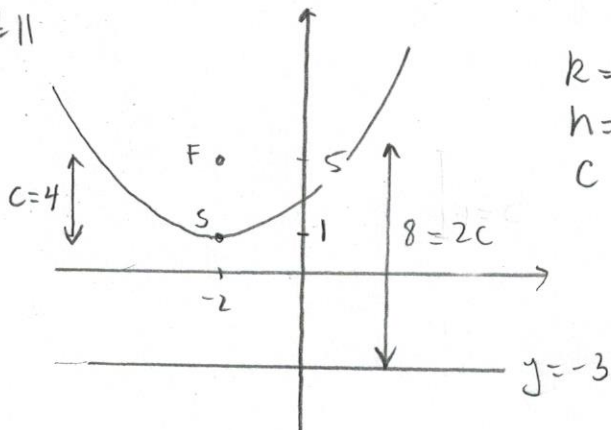
$(x+2)^2 = -16(y-4)$

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

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

$(y-2)^2 = 8(x+6)$

#11



$k = 1$

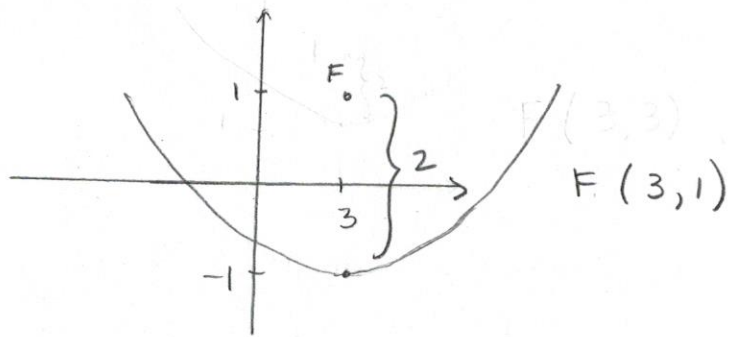
$h = -2$

$c = 4$

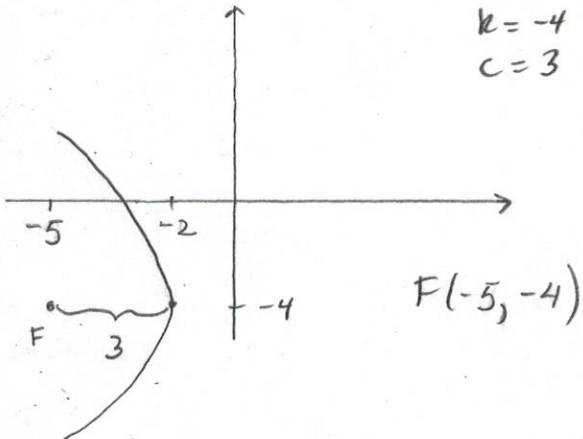
$(x-h)^2 = 4c(y-k)$

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

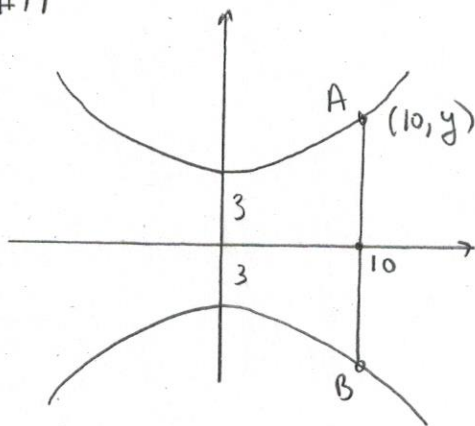
#12 $x^2 - 6x - 8y + 1 = 0$
 $x^2 - 6x + 9 = 8y - 1 + 9$
 $(x-3)^2 = 8y + 8$
 $(x-3)^2 = 8(y+1)$
 $c = 2$
 $h = 3 \quad k = -1$



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



#14

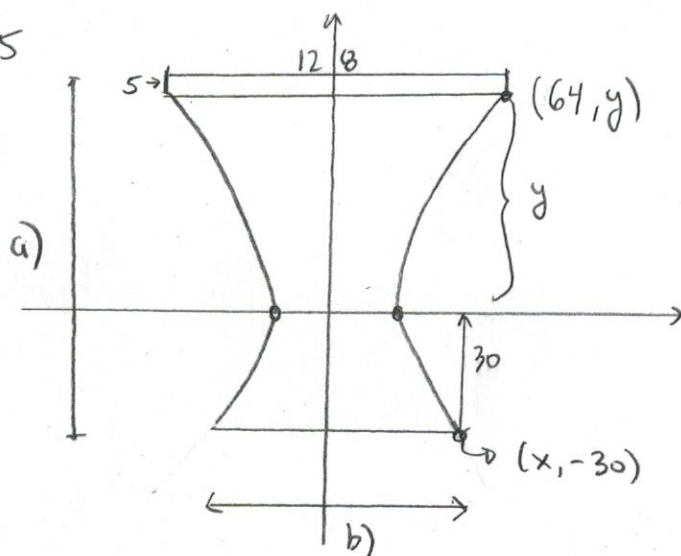


$b = 3$
 $2c = 18$
 $c = 9$
 $c^2 = a^2 + b^2$
 $81 = a^2 + 9$
 $72 = a^2$

$\frac{x^2}{72} - \frac{y^2}{9} = -1 \leftarrow (10, y)$
 $\frac{10^2}{72} - \frac{y^2}{9} = -1$
 $1,3\bar{8} - \frac{y^2}{9} = -1$
 $-\frac{y^2}{9} = -2,3\bar{8}$
 $\frac{y^2}{9} = 2,3\bar{8}$
 $y^2 = 21,5$
 $y = \pm\sqrt{21,5} = \pm 4,64$

rep $m_{AB} = 2 \times 4,64 = \underline{\underline{9,28 \text{ cm}}}$

#15



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

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

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

$$y^2 = 2477,44$$

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

$$y = \pm 49,77$$

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

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

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

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

$$x^2 = 1631,25$$

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

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

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

$$x^2 - 10x + 25 + y^2 + 4y + 4 = 13 + 25 + 4$$

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

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

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

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

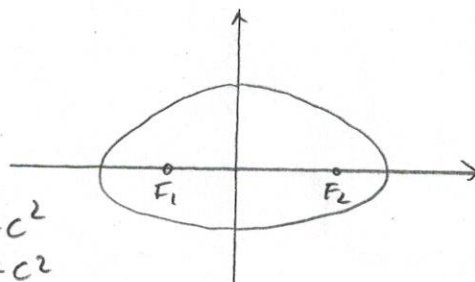
$$\frac{x^2}{16} + \frac{y^2}{10} = 1$$

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

$$16 = 10 + c^2$$

$$6 = c^2$$

$$c = \sqrt{6}$$



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

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

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

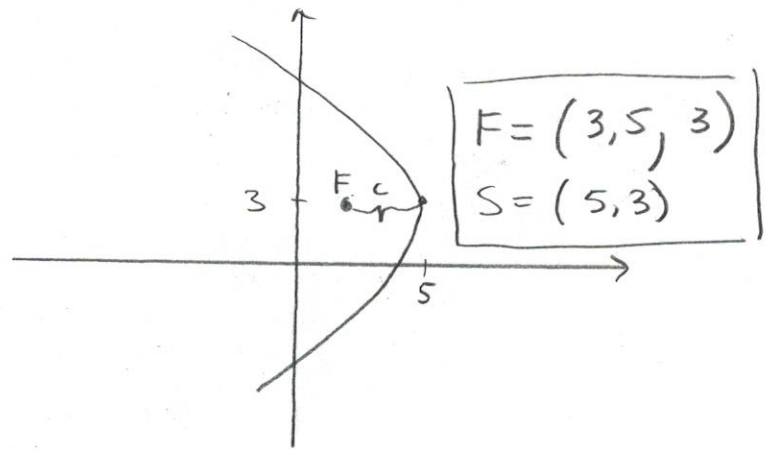
$$y^2 - 6y + 9 = -6x + 21 + 9$$

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

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

$$h = 5 \quad k = 3$$

$$c = 1,5$$



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

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

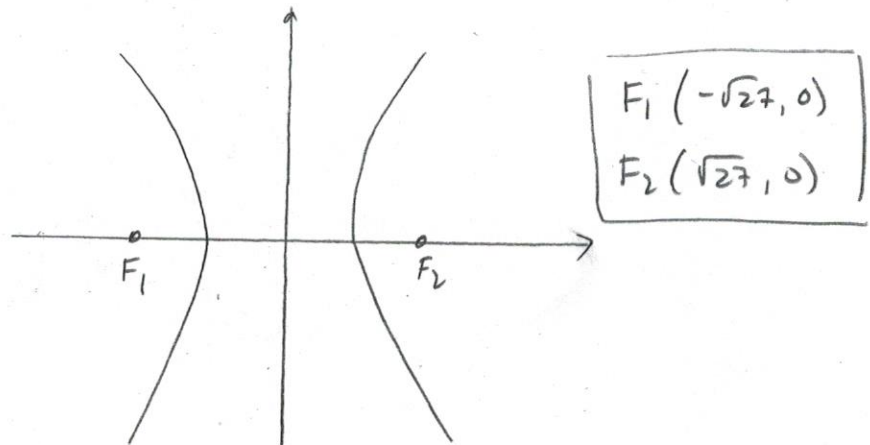
$$\frac{x^2}{18} - \frac{y^2}{9} = 1$$

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

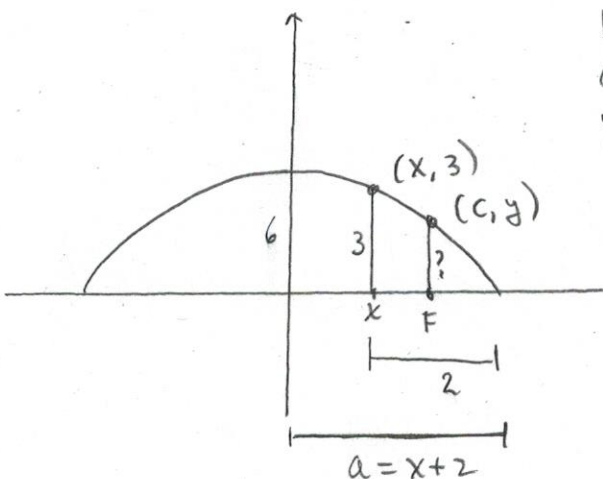
$$c^2 = 18 + 9$$

$$c^2 = 27$$

$$c = \sqrt{27}$$



#17



$$\left. \begin{array}{l} b = 6 \\ a = x + 2 \\ y = 3 \end{array} \right\}$$

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

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

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

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

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

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

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

$$x_1 = -0,93$$

$$x_2 = 12,93$$

#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 $y = ?$

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

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

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

$$y^2 = 6,12$$

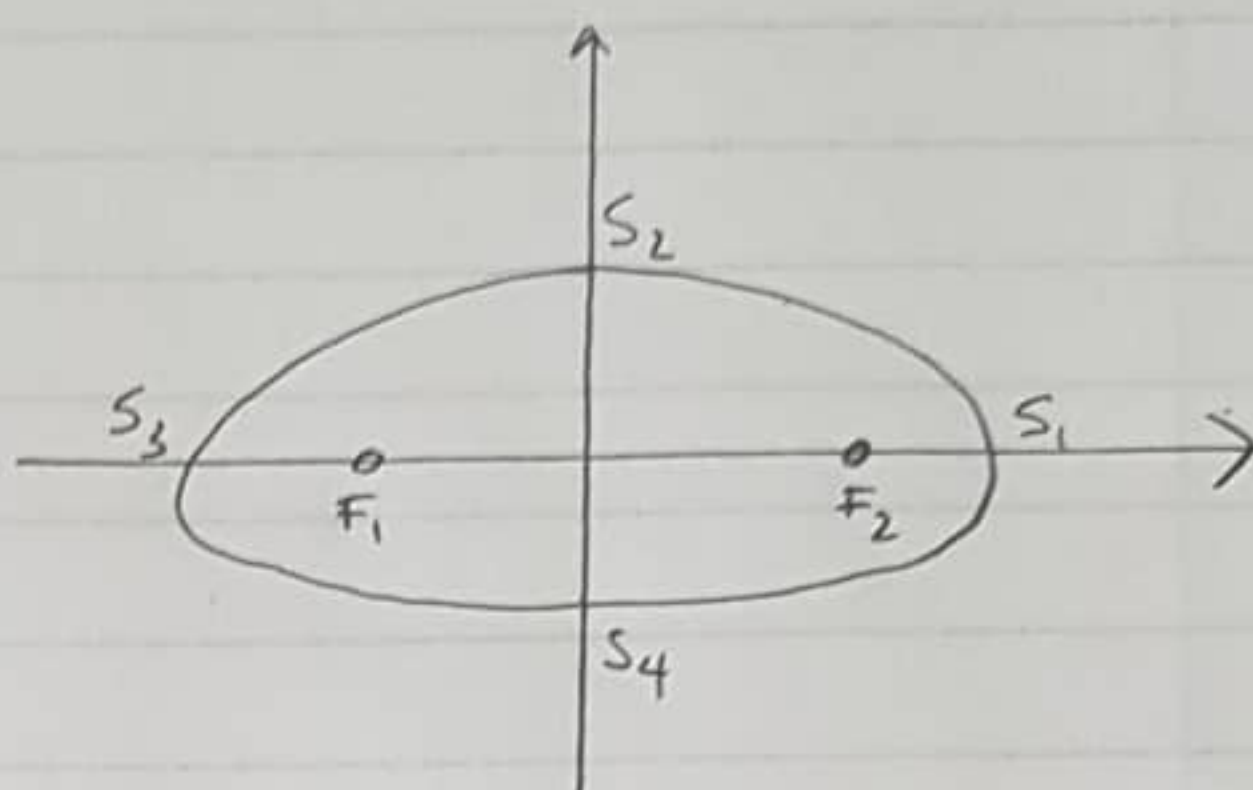
$$y = \pm \sqrt{6,12} = \pm 2,47 \quad \text{resp : } \boxed{2,47 \text{ u}}$$

#18

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

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

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



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

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

$$16 = 4 + c^2$$

$$c = \sqrt{12}$$

$$F_1(-\sqrt{12},0) \quad F_2(\sqrt{12},0)$$

#19 $x^2 + y^2 = 29$ $(-2, -5)$

$$(-2)^2 + (-5)^2 = 29$$

$$4 + 25 = 29 \text{ (oui)}$$

#20 $x^2 + y^2 = r^2$ $(-2, -6)$

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

$$4 + 36 = r^2$$

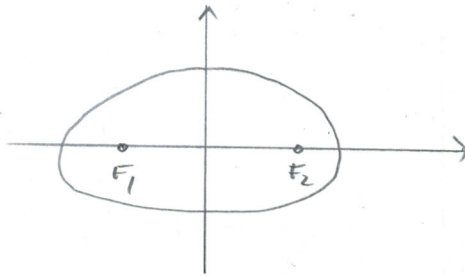
$$40 = r^2$$

$$\left. \begin{array}{l} (-2)^2 + (-6)^2 = r^2 \\ 4 + 36 = r^2 \\ 40 = r^2 \end{array} \right\} x^2 + y^2 = 40$$

#21 corde $= 2b = 2(18) = 36 = m \overline{PF_2} + 7$

$$29 = m \overline{PF_2}$$

#22 $\frac{x^2}{81} + \frac{y^2}{49} = 1$



$$a = 9$$

$$b = 7$$

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

$$81 = 49 + c^2$$

$$32 = c^2$$

$$\sqrt{32} = c$$

$$F_1(-\sqrt{32}, 0)$$

$$F_2(\sqrt{32}, 0)$$

#23 $\frac{x^2}{4} + \frac{y^2}{16} = 1$

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

$$16 = 4 + c^2$$

$$12 = c^2$$

$$\sqrt{12} = c$$

$$\left. \begin{array}{l} b^2 = a^2 + c^2 \\ 16 = 4 + c^2 \\ 12 = c^2 \end{array} \right\} 2c = 2\sqrt{12} \text{ ou } \approx 6,93$$

#24 $c = 5$ $2a = \text{corde} = 14 \Rightarrow a = 7$ $\left. \begin{array}{l} a^2 = b^2 + c^2 \\ 49 = b^2 + 25 \\ 24 = b^2 \end{array} \right\} \frac{x^2}{49} + \frac{y^2}{24} = 1$

#26 $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ $\left. \begin{array}{l} b=5 \\ c=8 \\ a=? \end{array} \right\} \left. \begin{array}{l} a^2 = b^2 + c^2 \\ a^2 = 25 + 64 \\ a^2 = 89 \end{array} \right\} \frac{x^2}{89} + \frac{y^2}{25} = 1$

Si $x=2$ $y=?$ $\frac{2^2}{89} + \frac{y^2}{25} = 1$

$\frac{4}{89} + \frac{y^2}{25} = 1$

$\frac{y^2}{25} = \frac{85}{89}$

$y^2 = 23,88$

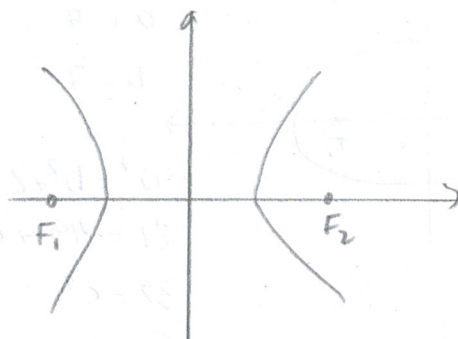
$y = 4,89 \Rightarrow m\overline{AB} = 2 \times 4,89 = \underline{9,78}$

#27 $\frac{x^2}{9} - \frac{y^2}{16} = 1$

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

$c^2 = 9 + 16$

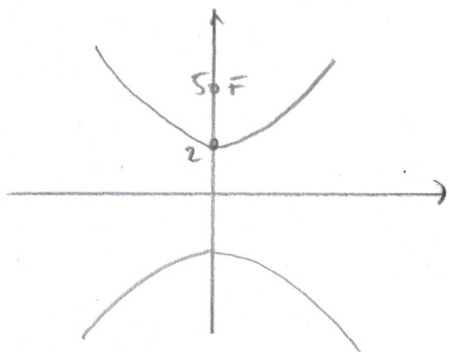
$c = 5$



$F_1(-5, 0)$

$F_2(5, 0)$

#28



$\left. \begin{array}{l} c=5 \\ b=2 \\ a=? \end{array} \right\} \left. \begin{array}{l} c^2 = a^2 + b^2 \\ 25 = a^2 + 4 \\ 21 = a^2 \end{array} \right\}$

$\frac{x^2}{21} - \frac{y^2}{4} = -1$