Cours d'appoint Extra janvier

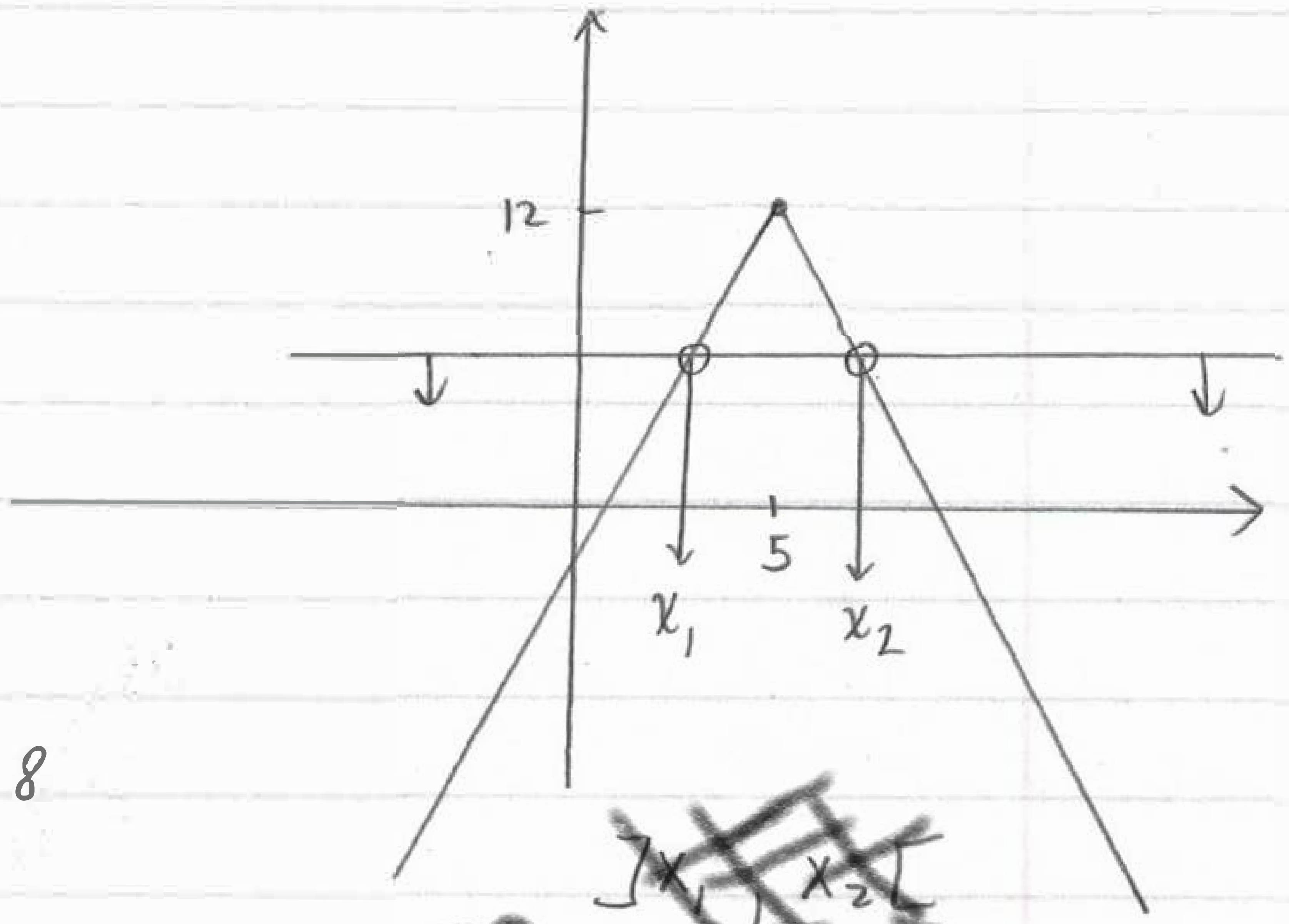
#1 $f(x) = -2|10-2x| + 12$

a) Traçons-la

$f(x) = -2|-2x + 10| + 12$

$f(x) = -2|-2(x-5)| + 12$

$f(x) = -4|x-5| + 12$



~~$]x_1, x_2[$~~

$]-\infty, x_1[\cup]x_2, +\infty[$

b) Trouvons l'intervalle lorsque $f(x) < 8$

$x = ?$ si $y = 8$

$8 = -4|x-5| + 12$

$-4 = -4|x-5|$

$1 = |x-5| \longrightarrow 1 = |x-5|$

$x-5 \geq 0$ ⊕ $\boxed{x \geq 5}$ ⊖ $x-5 < 0$ $\boxed{x < 5}$

$x-5 = 1$ $\boxed{x = 6}$

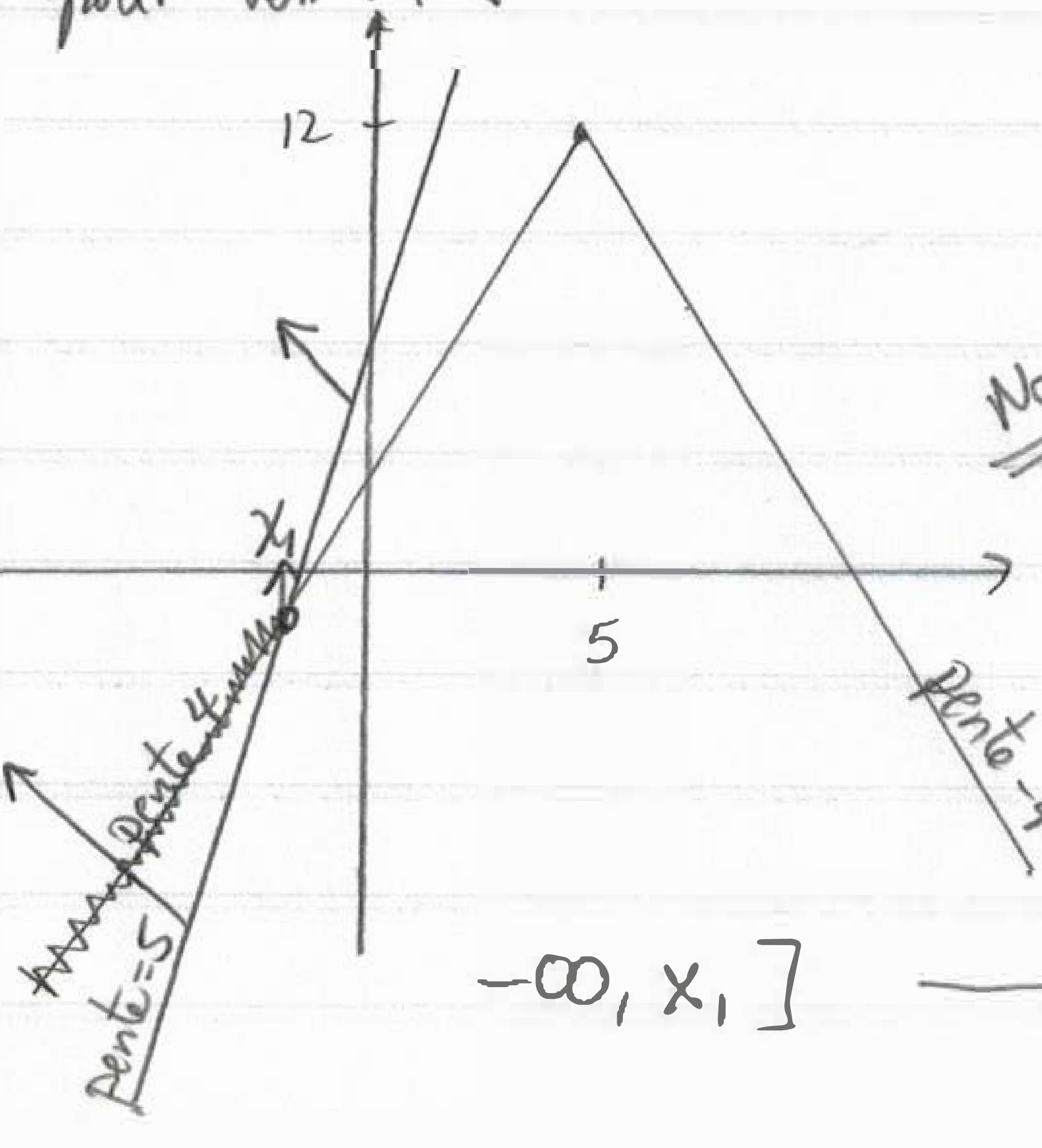
$x-5 = -1$ $\boxed{x = 4}$

~~$]4, 6[$~~

$]-\infty, 4[\cup]6, +\infty[$

c) Sur quel intervalle $f(x) \geq 5x + 2$

Juste pour voir!!! ↓



$]-\infty, x_1] \longrightarrow]-\infty, -10]$

$$-4|x-5| + 12 \overset{-12}{} = 5x + 2 \overset{-12}{}$$

$-4|x-5| = 5x - 10$

$|x-5| = -1{,}25x + 2{,}5$

$x \geq 5$ ⊕ ⊖ $x < 5$

No!

$x - 5 = -1{,}25x + 2{,}5$

$2{,}25x = 7{,}5$

$\rightarrow x = 3{,}\overline{3}$

ok

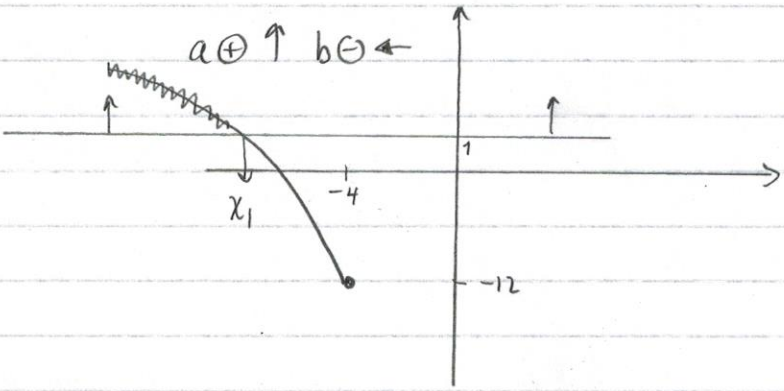
$x - 5 = 1{,}25x - 2{,}5$

$-0{,}25x = 2{,}5$

$\boxed{x = -10}$

#2 $f(x) = 5\sqrt{-2x-8} - 12$

a) Traçons la! $f(x) = 5\sqrt{-2(x+4)} - 12$



b) Sur quel intervalle $f(x) > 1$

$-\infty, x_1 [$

$x = ?$ si $y = 1$

$1 = 5\sqrt{-2x-8} - 12$

$13 = 5\sqrt{-2x-8}$

$2{,}6 = \sqrt{-2x-8}$

$6{,}76 = -2x - 8$

$14{,}76 = -2x$

$-7{,}38 = x$

$-2x - 8 \geq 0$

$-2x \geq 8$

$\boxed{x \leq -4}$

$-\infty, -7{,}38 [$

c) Trouvons sa réciproque $y = 5\sqrt{-2x-8} - 12$

$x = 5\sqrt{-2y-8} - 12$

$\frac{x+12}{5} = \sqrt{-2y-8}$

$\frac{x+12}{5} \geq 0$

$\downarrow$

$\boxed{x \geq -12}$

$-2y - 8 \geq 0$

$\downarrow$

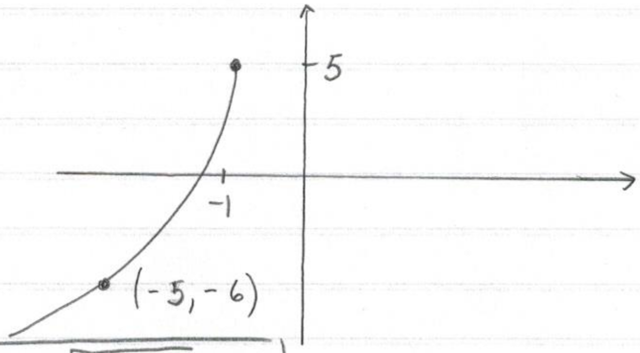
$\boxed{y \leq -4}$

$\frac{(x+12)^2}{25} = -2y - 8$

$$\frac{\frac{(x+12)^2}{25} + 8}{-2} = \frac{-2y}{-2}$$

$$\boxed{\frac{(x+12)^2}{-50} - 4 = y}$$

#3a) Trouvons la règle de cette fonction.



$$y = a\sqrt{b(x-h)} + k$$

$$y = a\sqrt{-1(x+1)} + 5 \qquad \underline{\underline{b=-1}}$$

$$-6 = a\sqrt{-1(-5+1)} + 5$$

$$-11 = a\sqrt{4}$$

$$-11 = a(2)$$

$$-5{,}5 = a$$

$$\boxed{y = -5{,}5\sqrt{-1(x+1)} + 5}$$

b) Trouver les "x" des pts d'intersection avec la droite $g(x) = 2x+4$

$$-5{,}5\sqrt{-1(x+1)} + 5 = 2x+4$$

$$-5{,}5\sqrt{-1(x+1)} = 2x-1$$

$$\sqrt{-1(x+1)} = \frac{2x-1}{-5{,}5}$$

$$-1(x+1) \geq 0 \qquad \frac{2x-1}{-5{,}5} \geq 0$$

$$x+1 \leq 0 \qquad 2x-1 \leq 0$$

$$\boxed{x \leq -1} \qquad \boxed{x \geq \frac{1}{2}}$$

$$-1(x+1) = \frac{4x^2-4x+1}{30{,}25} \qquad (2x-1)(2x-1)^{***}$$

$$-30{,}25(x+1) = 4x^2-4x+1$$

$$-30{,}25x - 30{,}25 = 4x^2-4x+1$$

$$0 = 4x^2 + 26{,}25x + 31{,}25$$

$$\frac{-26{,}25 \pm \sqrt{689{,}0625 - 4(4)(31{,}25)}}{8}$$

$$\frac{-26{,}25 \pm \sqrt{689{,}0625 - 500}}{8}$$

$$\frac{-26{,}25 \pm \sqrt{189{,}0625}}{8}$$

$$x_1 = \frac{-26{,}25 + 13{,}75}{8} = \boxed{-1{,}5625}$$

$$x_2 = \frac{-26{,}25 - 13{,}75}{8} = \boxed{-5}$$

OK

#4 Soit $f(x) = \frac{6x-5}{2x+8}$

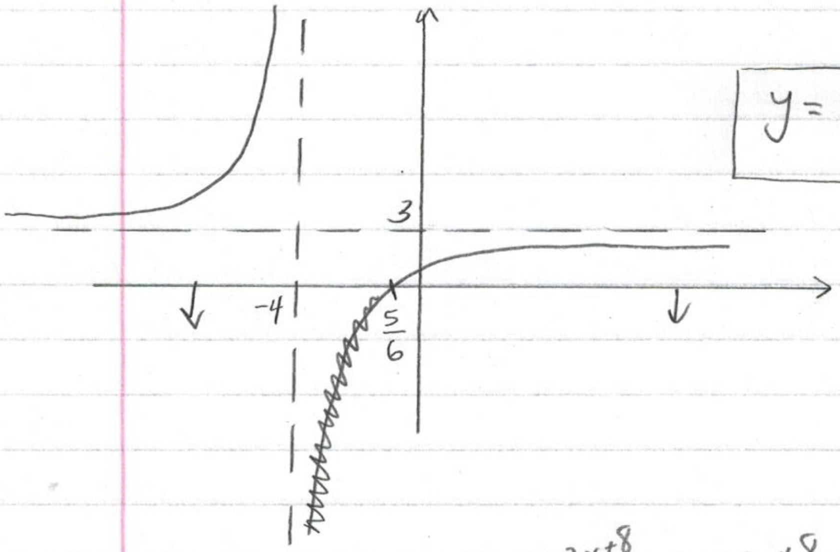
a) Traçons-là

$$\begin{array}{r|l} 6x-5 & 2x+8 \\ \hline -\underline{(6x+24)} & 3 \\ -29 & \end{array}$$

$y = \frac{-29}{2x+8} + 3$

$y = \frac{-29}{2(x+4)} + 3$

$\boxed{y = \frac{-14,5}{x+4} + 3}$



b) Trouvons le zéro. $\overset{\cdot 2x+8}{0} = \frac{6x-5}{2x+8} \cdot 2x+8$

$0 = 6x-5$

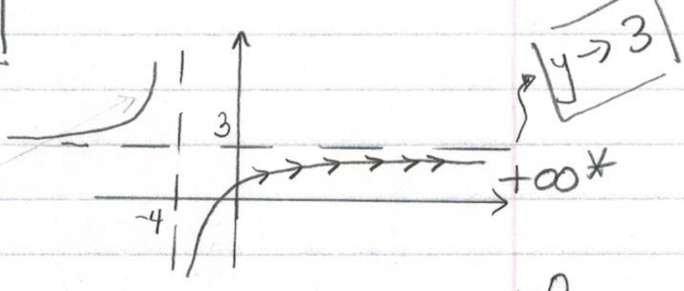
$\boxed{\frac{5}{6} = x}$

c) Trouvons l'intervalle lorsque $f(x) < 0$: $\boxed{]-4, \frac{5}{6}[}$

d) Eq. asymptotes $\boxed{x = -4 \text{ et } y = 3}$

e) Si $x \to +\infty$ $y \to \boxed{?}$

2 méthodes : No1 graphique



No2 $\lim\limits_{x \to +\infty} \frac{-14,5}{x+4} + 3 = \frac{-14,5}{+\infty+4} + 3 = \overset{\to 0}{\frac{-14,5}{+\infty}} + 3 = \boxed{3}$

#5 Soit $f(x) = 2x+1$ et $g(x) = -3x+4$

Trouvons $(f \circ g)(x) = ?$

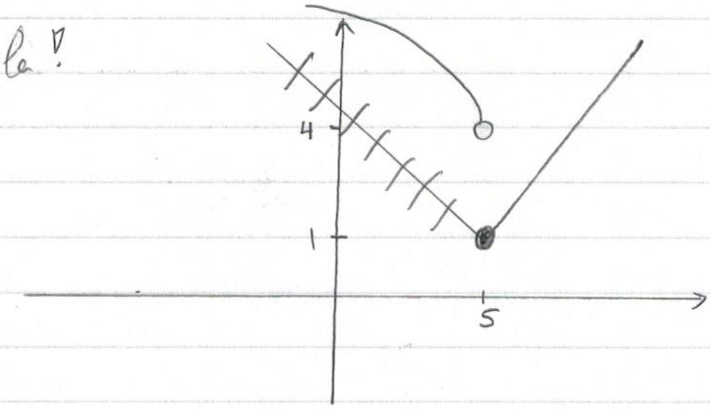
$$(f \circ g)(x) = f(g(x)) = f(-3x+4) = 2(-3x+4)+1$$
$$= -6x+8+1$$
$$= \underline{\underline{-6x+9}}$$

#6 Soit la fonction définie en partie suivante

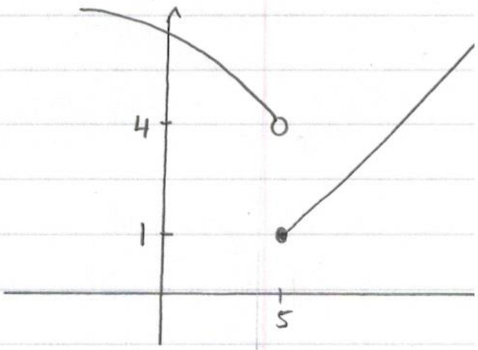
$$3|x-5|+1$$
$$\Uparrow$$
$$(3|-1(x-5)|+1)$$

$$f(x) = \begin{cases} 3|-x+5|+1 & \text{si } x \geq 5 \\ 2\sqrt{-1(x-5)}+4 & \text{si } x < 5 \end{cases}$$

a) Traçons-la !



Ebauche



FINALE

b) Fonction discontinue

#7 $2\sqrt{4x-8} - 12 = -x-2$

Etape 1 : Isoler la √

$$2\sqrt{4x-8} \overset{+12}{-12} = \overset{+12}{x-2}$$

$$\frac{2\sqrt{4x-8}}{2} = \frac{-x+10}{2}$$

$$\sqrt{4x-8} = -0{,}5x + 5$$

Etape 2 : Faire les restrictions ⇒ $4x-8 \geq 0$ et $0{,}5x+5 \geq 0$

$\boxed{x \geq 2}$ $\boxed{x \geq -10}$

Etape 3 : Isoler "x"

$$4x-8 = (-0.5x+5)^2 \Rightarrow (-0.5x+5)(-0{,}5x+5)$$

$$4x-8 = 0{,}25x^2 - 5x + 25$$

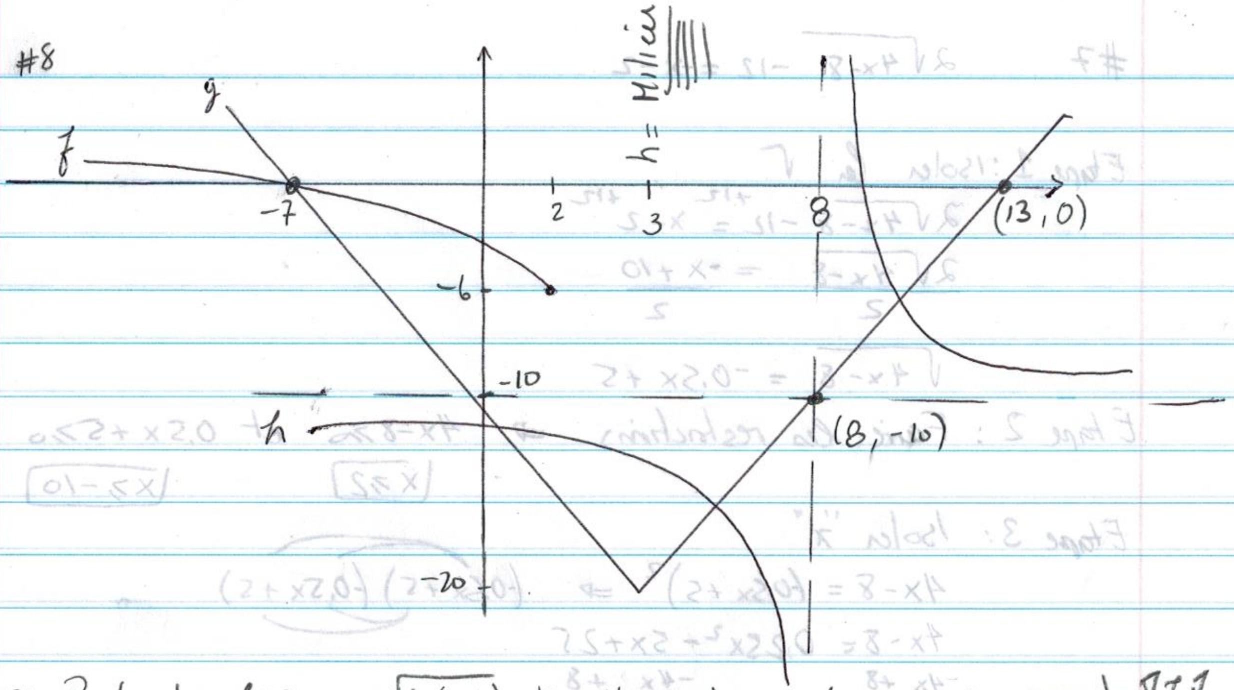
$$\underset{-4x\ +8}{} \qquad \underset{-4x\ +8}{\phantom{0{,}25x^2}}$$

$$0 = 0{,}25x^2 - 9x + 33$$

$$\frac{9 \pm \sqrt{81-4(0.25)(33)}}{0.5} = \frac{9 \pm \sqrt{48}}{0{,}5} \quad \begin{matrix} ⊕\ 31{,}86 \\ ⊖\ 4{,}14 \end{matrix}$$ } respectent les 2 restrictions

$x = 31{,}86$ et $x = 4{,}14$

#8



① Regle de $f(x) = a\sqrt{b(x-h)}+k$ $h=2$ $k=-6$ $\underline{b=-1}$ car $\underline{\text{ouest}}$?!?

$f(x) = a\sqrt{-1(x-2)}-6$: $(1,-4)$

$-4 = a\sqrt{-1(1-2)}-6$

$-4 = a\sqrt{1}-6$

$2 = a$

$$\boxed{f(x) = 2\sqrt{-1(x-2)}-6}$$

② Zero de "f" $0 = 2\sqrt{-1(x-2)}-6$ → $\frac{-1(x-2)}{-1} \geq \frac{0}{-1}$

$\underline{3 = \sqrt{-1(x-2)}}$

$x-2 \leq 0$

$\boxed{x \leq 2}$

$9 = -1(x-2)$

$-9 = x-2$

$\boxed{-7 = x}$

③ pt. d'intersection (h,k) des asymptotes de $h(x)$

$$\begin{array}{r|l} -10x+81 & x-8 \\ \hline -10x+80 & -10 \\ \hline 1 & \end{array}$$

$h(x) = \frac{1}{x-8} - 10$ $h=8$ $k=-10$

④ Regle de $g(x)$: $g(x) = a|x-h|+k$

"h" = $\underline{\text{milieu}}$ des 2 zeros $h = \frac{-7+13}{2} = 3$ | $a = \frac{\Delta y}{\Delta x}$ branche droite $= \frac{0--10}{13-8} = \frac{10}{5} = 2$

#8 suite

$g(x) = 2|x-3| + k$: $(13,0)$

$0 = 2|13-3| + k$

$0 = 2(10) + k$

$0 = 20 + k$

$-20 = k$

$g(x) = 2|x-3| - 20$

Ima g = $[-20, +\infty$