Sommet d'une parabole (module 7) $f(x) = ax^2 + bx + c$

On calcul $\Delta = (b)^2 - 4(a)(c)$ et alors $S = \left(-\frac{b}{2a} ; -\frac{\Delta}{4a}\right)$

Exemple : $f(x) = -x^2 + 2x + 1$: $a = -1$, $b = 2$ et $c = 1$

ainsi $\Delta = (2)^2 - 4(-1)(1) = 4 + 4 = 8 \Rightarrow S = \left(-\frac{2}{-2} ; -\frac{8}{-4}\right) = (1;2)$

module 8 esquisser la fonction $f(x) = -2x^2 + 4x - 1$

$a = -2$, $b = 4$ et $c = -1$ donc $\Delta = (b)^2 - 4(a)(c) = (4)^2 - 4(-2)(-1) = 16 - 8 = 8 > 0$

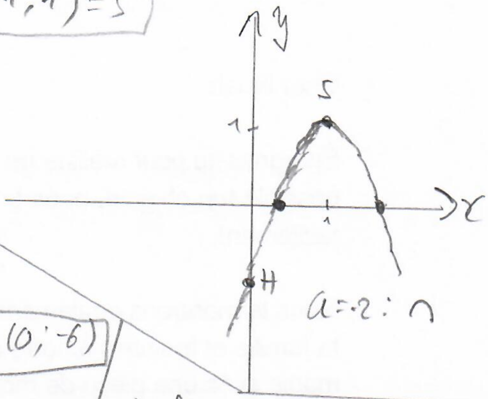
triste : ∩

comme $\Delta > 0$ on a 2 solutions $x_{1,2} = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-4 \pm \sqrt{8}}{-4} = \begin{cases} + & 0{,}3 \Rightarrow \boxed{(0{,}3;0)} \\ - & 1{,}7 \Rightarrow \boxed{(1{,}7;0)} \end{cases}$

machine

et le sommet $S = \left(-\frac{b}{2a} ; -\frac{\Delta}{4a}\right) = \left(\frac{-4}{-4} ; \frac{-8}{-8}\right) = \boxed{(1;1) = S}$

L'ordonnée à l'origine $\boxed{H(0;c) = (0;-1)}$

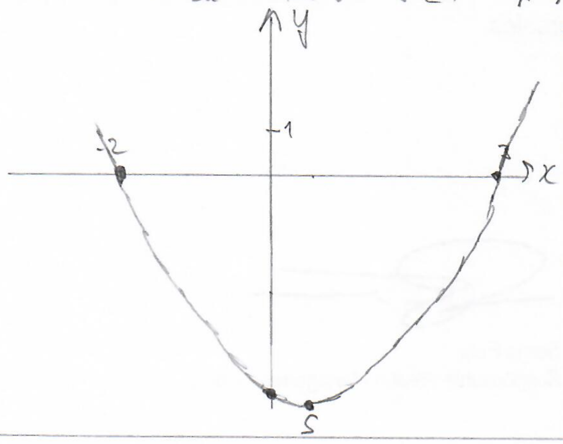


8.11 a) $f(x) = x^2 - x - 6 \Rightarrow a = 1$, $b = -1$ et $c = -6$

$\Delta = (b)^2 - 4(a)(c) = (-1)^2 - 4(1)(-6) = 1 + 24 = 25 = 5^2$

$x_{1,2} = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{1 \pm 5}{2} = \begin{cases} + & \frac{6}{2} = 3 \Rightarrow \boxed{(3;0)} \\ - & \frac{-4}{2} = -2 \Rightarrow \boxed{(-2;0)} \end{cases}$ $\boxed{H(0;c) = (0;-6)}$

Sommet $S\left(-\frac{b}{2a} ; -\frac{\Delta}{4a}\right) = \left(\frac{1}{2} ; -\frac{25}{4}\right) = \boxed{(0{,}5;-6{,}25) = S}$



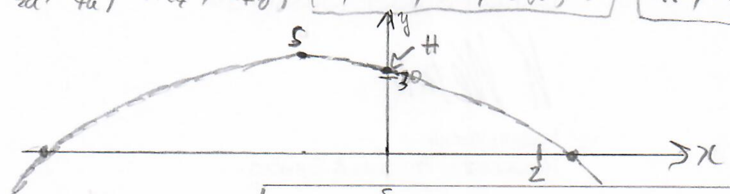
b) $f(x) = -12x^2 - 13x + 35$

$a = -12$: ∩, $b = -13$ et $c = 35$

$\Delta = (b)^2 - 4(a)(c) = (-13)^2 - 4(-12)(35) = 1849 = 43^2$

zéros : $x_{1,2} = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{13 \pm 43}{-24} = \begin{cases} + & \frac{56}{-24} = -2{,}\overline{3} \Rightarrow \boxed{(-2{,}\overline{3};0)} \\ - & \frac{-30}{-24} = 1{,}25 \Rightarrow \boxed{(1{,}25;0)} \end{cases}$

$S\left(-\frac{b}{2a} ; -\frac{\Delta}{4a}\right) = \left(\frac{13}{-24} ; \frac{-1849}{-48}\right) = \boxed{(-0{,}541\overline{6} ; 38{,}5208\overline{3}) = S}$ $\boxed{H(0;35)}$

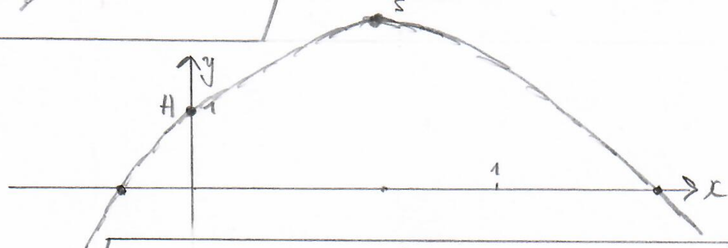


c) $f(x) = -3x^2 + 4x + 1$, $a = -3$: ∩, $b = 4$ et $c = 1$ $\boxed{H(0;1)}$

$\Delta = (b)^2 - 4(a)(c) = (4)^2 - 4(-3)(1) = 16 + 12 = 28$

zéros : $x_{1,2} = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-4 \pm \sqrt{28}}{-6} = \begin{cases} + & -0{,}215 \Rightarrow \boxed{(-0{,}215;0)} \\ - & 1{,}55 \Rightarrow \boxed{(1{,}55;0)} \end{cases}$

sommet $S\left(-\frac{b}{2a} ; -\frac{\Delta}{4a}\right) = \left(\frac{-4}{-6} ; \frac{-28}{-12}\right) = \boxed{(0{,}\overline{6} ; 2{,}\overline{3}) = S}$



d) $f(x) = x^2 + 2x + 4$, $a = 1$, $b = 2$ et $c = 4 \Rightarrow \boxed{H(0;4)}$

$\Delta = (b)^2 - 4(a)(c) = (2)^2 - 4(1)(4) = 4 - 16 = -12 \Rightarrow$ pas de zéro

Sommet $S\left(-\frac{b}{2a} ; -\frac{\Delta}{4a}\right) = \left(\frac{-2}{2} ; \frac{12}{4}\right) = \boxed{(-1;3) = S}$

$a = 1$: ∪