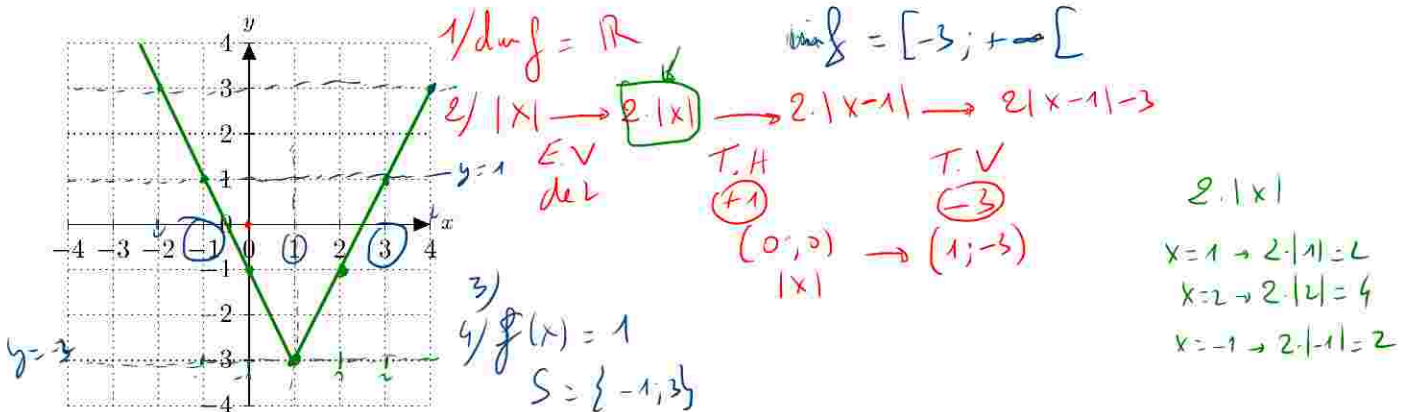
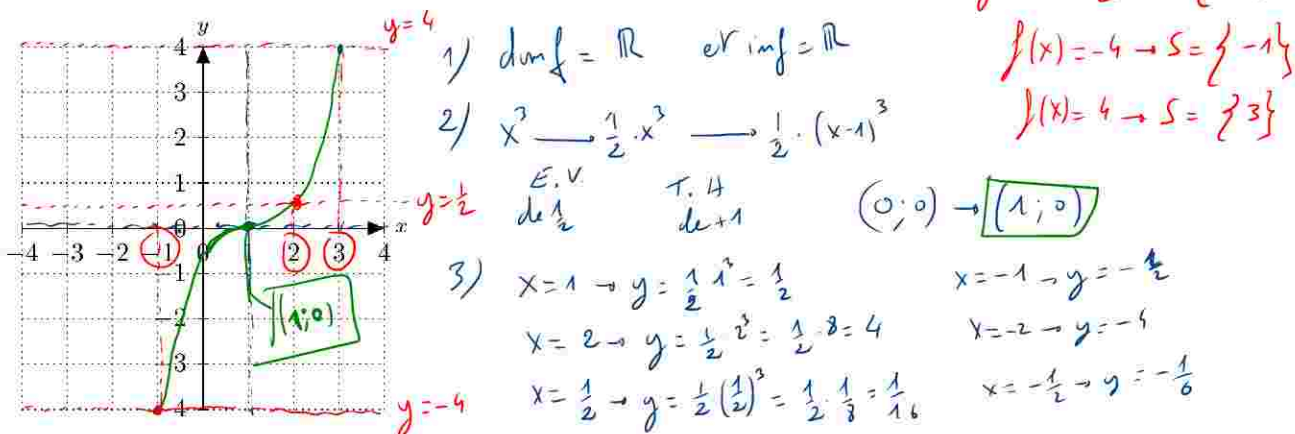


Dans les équations du type $f(x) = k$ ci-dessous : 1) Détermine l'ensemble de définition et l'ensemble image ; 2) Indique les transformations élémentaires du graphe de la fonction de référence associée ; 3) Trace le graphe de f ; 4) Résous algébriquement les équations proposées sur **une autre feuille**

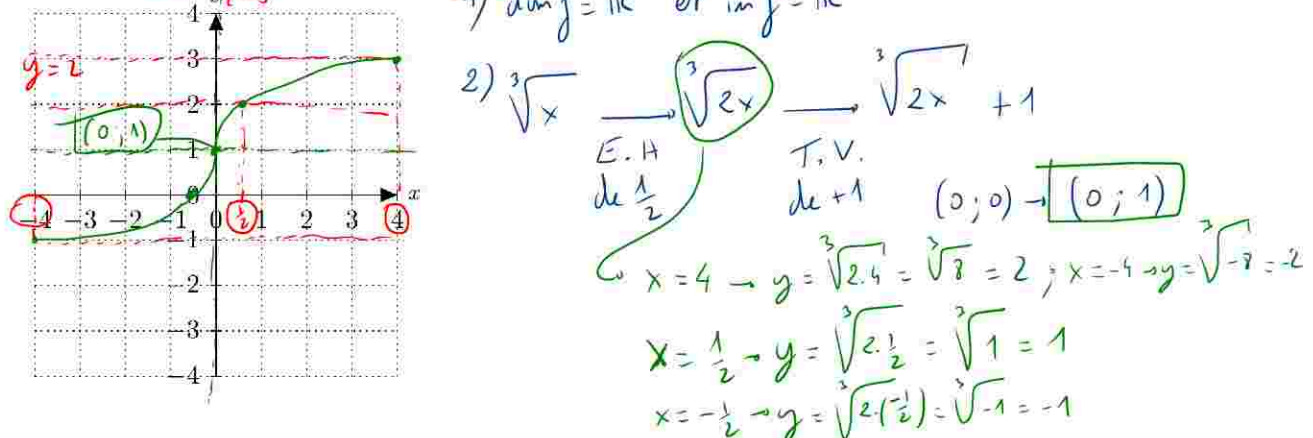
1 $2|x-1|-3=1$ et $2|x-1|-3=-3$ et $2|x-1|-3=3$



2 $\frac{(x-1)^3}{2} = \frac{1}{2}$ et $\frac{(x-1)^3}{2} = -4$ et $\frac{(x-1)^3}{2} = 4$



3 $\sqrt[3]{2x+1} = 2$ et $\sqrt[3]{2x+1} = -1$ et $\sqrt[3]{2x+1} = 3$



$$1) \quad 2 \cdot |x-1| - 3 = 1 \Leftrightarrow \underset{x+3}{2|x-1| = 4} \Leftrightarrow \underset{\frac{x}{2}}{|x-1| = 2} \Leftrightarrow x-1=2 \vee x-1=-2 \Leftrightarrow x=3 \vee x=-1 \quad S = \{-1; 3\}$$

$$2 \cdot |x-1| - 3 = -3 \Leftrightarrow \underset{x+3}{2|x-1| = 0} \Leftrightarrow \underset{\frac{x}{2}}{|x-1| = 0} \Leftrightarrow x-1=0 \Leftrightarrow \boxed{x=1} \quad \boxed{S = \{1\}}$$

$$2 \cdot |x-1| - 3 = 3 \Leftrightarrow \underset{x+3}{2|x-1| = 6} \Leftrightarrow \underset{\frac{x}{2}}{|x-1| = 3} \Leftrightarrow x-1=3 \vee x-1=-3 \Leftrightarrow x=4 \vee x=-2 \quad \boxed{S = \{-2; 4\}}$$

$$2) \quad \frac{(x-1)^3}{2} = \frac{1}{2} \Leftrightarrow \underset{2 \cdot x}{(x-1)^3 = 1} \Leftrightarrow \underset{\sqrt[3]{x}}{\sqrt[3]{(x-1)^3} = \sqrt[3]{1}} \Leftrightarrow \underset{\substack{\text{Cancel} \\ \text{Simplification}}}{x-1=1} \Leftrightarrow \underset{x+1}{x=2} \quad \boxed{S = \{2\}}$$

$$\frac{(x-1)^3}{2} = -4 \Leftrightarrow \underset{2 \cdot x}{(x-1)^3 = -8} \Leftrightarrow \underset{\sqrt[3]{x}}{x-1 = \sqrt[3]{-8}} \Leftrightarrow x = 1 + \sqrt[3]{-8} \Leftrightarrow x = 1 - 2 \Leftrightarrow \boxed{x = -1} \quad \boxed{S = \{-1\}}$$

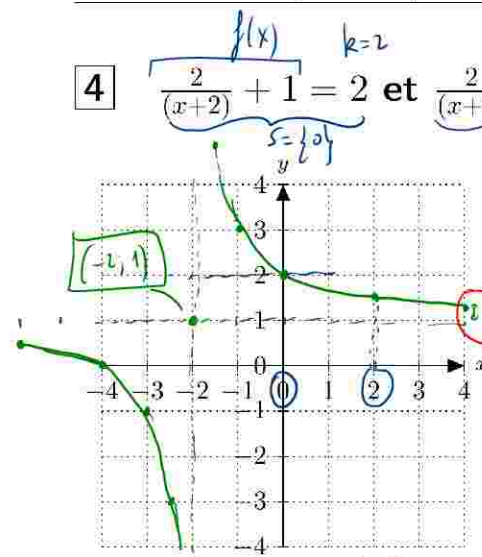
$$\frac{(x-1)^3}{2} = 4 \Leftrightarrow \underset{2 \cdot x}{(x-1)^3 = 8} \Leftrightarrow \underset{\sqrt[3]{x}}{x-1 = \sqrt[3]{8}} \Leftrightarrow x = 1 + 2 \Leftrightarrow \boxed{x = 3} \quad \boxed{S = \{3\}}$$

$$3) \quad \sqrt[3]{2x} + 1 = 2 \Leftrightarrow \underset{x-1}{\sqrt[3]{2x} = 1} \Leftrightarrow \underset{x^3}{2x = 1^3} \Leftrightarrow x = \frac{1}{2} \quad S = \left\{ \frac{1}{2} \right\}$$

$$\sqrt[3]{2x} + 1 = -1 \Leftrightarrow \underset{x-1}{\sqrt[3]{2x} = -2} \Leftrightarrow \underset{x^3}{2x = (-2)^3} \Leftrightarrow 2x = -8 \Leftrightarrow x = -4 \quad \boxed{S = \{-4\}}$$

$$\sqrt[3]{2x} + 1 = 3 \Leftrightarrow \underset{x-1}{\sqrt[3]{2x} = 2} \Leftrightarrow \underset{x^3}{2x = 2^3} \Leftrightarrow 2x = 8 \Leftrightarrow x = 4 \quad \boxed{S = \{4\}}$$

4) $\frac{2}{(x+2)} + 1 = 2$ et $\frac{2}{(x+2)} + 1 = \frac{3}{2}$ et $\frac{2}{(x+2)} + 1 = 0$



1) CE: $x+2 \neq 0 \Leftrightarrow x \neq -2 \rightarrow \text{dom } f = \mathbb{R} \setminus \{-2\}$

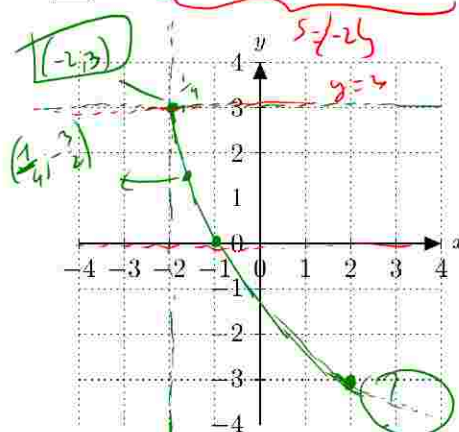
$\text{im } f = \mathbb{R} \setminus \{1\}$

2) $\frac{1}{x} \xrightarrow{\text{E.V. de 2}} \left(\frac{2}{x}\right) \xrightarrow{\text{T.H. de -2}} \frac{2}{x+2} \xrightarrow{\text{T.V. de +1}} \frac{2}{x+2} + 1$

$(0; 0) \rightarrow (-2; 1)$

$x = \frac{1}{2} \rightarrow y = \frac{2}{\frac{1}{2}+2} = \frac{4}{5}$
 $x = 1 \rightarrow y = \frac{2}{1+2} = \frac{2}{3}$
 $x = 2 \rightarrow y = \frac{2}{2+2} = \frac{1}{2}$

5) $-\sqrt{9x+18}+3=3$ et $-\sqrt{9x+18}+3=0$ et $-\sqrt{9x+18}+3=-3$



1) CE: $9x+18 \geq 0 \Leftrightarrow 9x \geq -18 \Leftrightarrow x \geq -2 \rightarrow \text{dom } f = [-2; +\infty[$

2) $\sqrt{9x+18} = \sqrt{9(x+2)} = \sqrt{9} \cdot \sqrt{x+2} = 3\sqrt{x+2}$

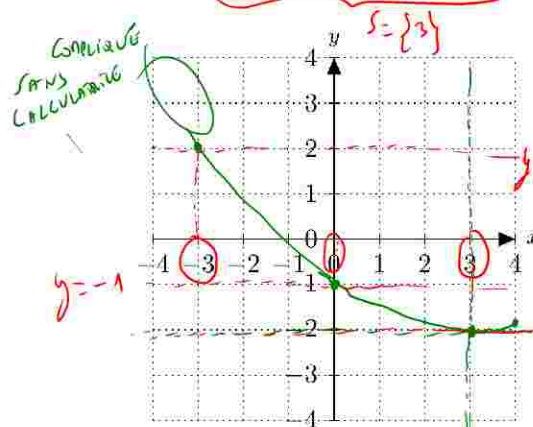
$f(x) = -3\sqrt{x+2} + 3$

$\sqrt{x} \xrightarrow{\text{E.V. de -3}} (-3\sqrt{x}) \xrightarrow{\text{T.H. de -2}} -3\sqrt{x+2} \xrightarrow{\text{T.V. de +3}} -3\sqrt{x+2} + 3$

$(0; 0) \rightarrow (-2; 3)$

$x = 1 \rightarrow y = -3\sqrt{1+2} = -3\sqrt{3}$
 $x = 4 \rightarrow y = -3\sqrt{4+2} = -3\sqrt{6}$

6) $\left(\frac{x}{3}-1\right)^2-2=-2$ et $\left(\frac{x}{3}-1\right)^2-2=-1$ et $\left(\frac{x}{3}-1\right)^2-2=2$



1) $\text{dom } f = \mathbb{R}$ et $\text{im } f = [-2; +\infty[$

2) $x^2 \xrightarrow{\text{E.H. de 3}} \left(\frac{x}{3}\right)^2 \xrightarrow{\text{T.H. de -3}} \left(\frac{1}{3}(x-3)\right)^2 \xrightarrow{\text{T.V. de -2}} \left(\frac{1}{3}(x-3)\right)^2 - 2$

$(0; 0) \rightarrow (3; -2)$

$x = 1 \rightarrow y = \left(\frac{1}{3}-1\right)^2 - 2 = \left(-\frac{2}{3}\right)^2 - 2 = \frac{4}{9} - 2 = -\frac{14}{9}$
 $x = 3 \rightarrow y = \left(\frac{3}{3}-1\right)^2 - 2 = 0 - 2 = -2$
 $x = 6 \rightarrow y = \left(\frac{6}{3}-1\right)^2 - 2 = 1 - 2 = -1$

$x = 9 \rightarrow y = \left(\frac{9}{3}-1\right)^2 - 2 = 4 - 2 = 2$

$$14) \frac{2}{x+2} + 1 = 2 \Leftrightarrow \frac{2}{x+2} = 1 \Leftrightarrow \frac{x+2}{2} = \frac{1}{1} \Leftrightarrow x+2 = 2 \Leftrightarrow x = 0 \quad S = \{0\}$$

$$\frac{2}{x+2} + 1 = \frac{3}{2} \Leftrightarrow \frac{2}{x+2} = \frac{3}{2} - 1 \Leftrightarrow \frac{2}{x+2} = \frac{1}{2} \Leftrightarrow \frac{x+2}{2} = 2 \Leftrightarrow x+2 = 4 \Leftrightarrow x = 2 \quad S = \{2\}$$

$$\frac{2}{x+2} + 1 = 0 \Leftrightarrow \frac{2}{x+2} = -1 \Leftrightarrow \frac{x+2}{2} = \frac{1}{-1} \Leftrightarrow x+2 = -2 \Leftrightarrow x = -4 \quad S = \{-4\}$$

$$15) -\sqrt{9x+18} + 3 = 3 \Leftrightarrow -\sqrt{9x+18} = 0 \Leftrightarrow \sqrt{9x+18} = 0 \Leftrightarrow 9x+18 = 0^2 \Leftrightarrow 9x = -18 \Leftrightarrow x = -2 \quad S = \{-2\}$$

$$-\sqrt{9x+18} + 3 = 0 \Leftrightarrow -\sqrt{9x+18} = -3 \Leftrightarrow \sqrt{9x+18} = 3 \Leftrightarrow 9x+18 = 3^2 \Leftrightarrow 9x = 9-18 \Leftrightarrow 9x = -9 \Leftrightarrow x = -1 \quad S = \{-1\}$$

$$-\sqrt{9x+18} + 3 = -3 \Leftrightarrow -\sqrt{9x+18} = -6 \Leftrightarrow \sqrt{9x+18} = 6 \Leftrightarrow 9x+18 = 6^2 \Leftrightarrow 9x = 36-18 \Leftrightarrow 9x = 18 \Leftrightarrow x = 2 \quad S = \{2\}$$

$$16) \left(\frac{x}{3} - 1\right)^2 - 2 = -2 \Leftrightarrow \left(\frac{x}{3} - 1\right)^2 = 0 \Leftrightarrow \frac{x}{3} - 1 = 0 \Leftrightarrow \frac{x}{3} = 1 \Leftrightarrow x = 3 \quad S = \{3\}$$

$$\left(\frac{x}{3} - 1\right)^2 - 2 = -1 \Leftrightarrow \left(\frac{x}{3} - 1\right)^2 = 1 \Leftrightarrow \frac{x}{3} - 1 = \sqrt{1} \text{ ou } \frac{x}{3} - 1 = -\sqrt{1}$$

$$\Leftrightarrow \frac{x}{3} - 1 = 1 \text{ ou } \frac{x}{3} - 1 = -1$$

$$\Leftrightarrow \frac{x}{3} = 2 \text{ ou } \frac{x}{3} = 0$$

$$\Leftrightarrow x = 6 \text{ ou } x = 0 \quad S = \{0, 6\}$$

$$\left(\frac{x}{3} - 1\right)^2 - 2 = 2 \Leftrightarrow \left(\frac{x}{3} - 1\right)^2 = 4 \Leftrightarrow \frac{x}{3} - 1 = \sqrt{4} \text{ ou } \frac{x}{3} - 1 = -\sqrt{4}$$

$$\Leftrightarrow \frac{x}{3} - 1 = 2 \text{ ou } \frac{x}{3} - 1 = -2$$

$$\Leftrightarrow \frac{x}{3} = 3 \text{ ou } \frac{x}{3} = -1$$

$$\Leftrightarrow x = 9 \text{ ou } x = -3 \quad S = \{-3, 9\}$$