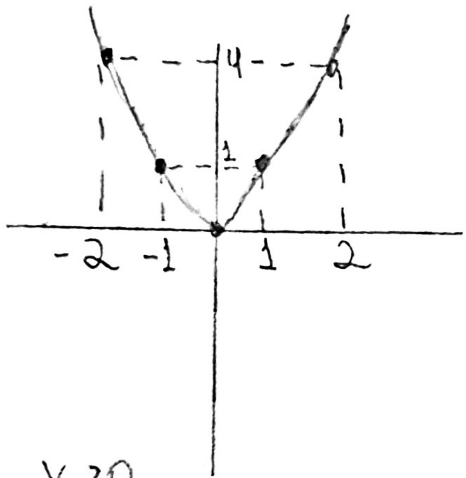
$$f(x) = \begin{cases} x^4 & \text{se} \quad x \le 0 \to h(x) \\ -1-x^5 & \text{se} \quad x > 0 \to g(x) \end{cases}$$

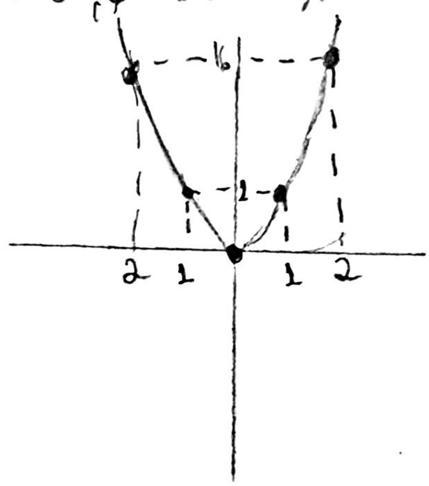
a) Esboço da $f(x)$

*Para $x \le 0$

Gráfico base x^2

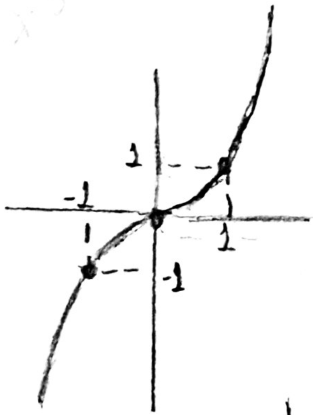


Esboço do x^4 $h(x)$

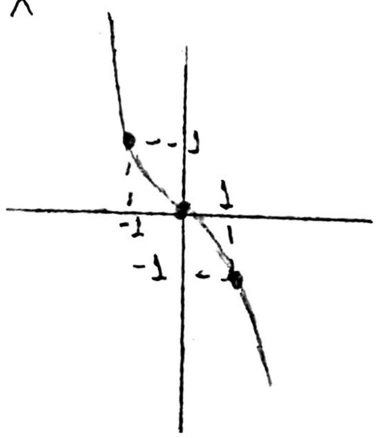


*Para $x > 0$

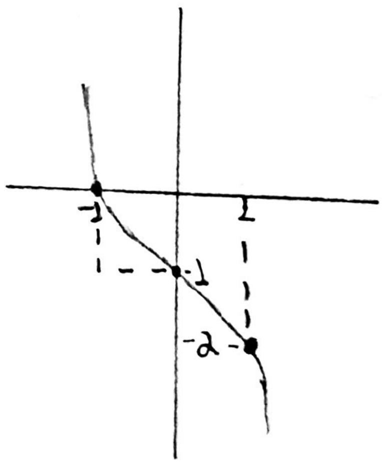
x^5



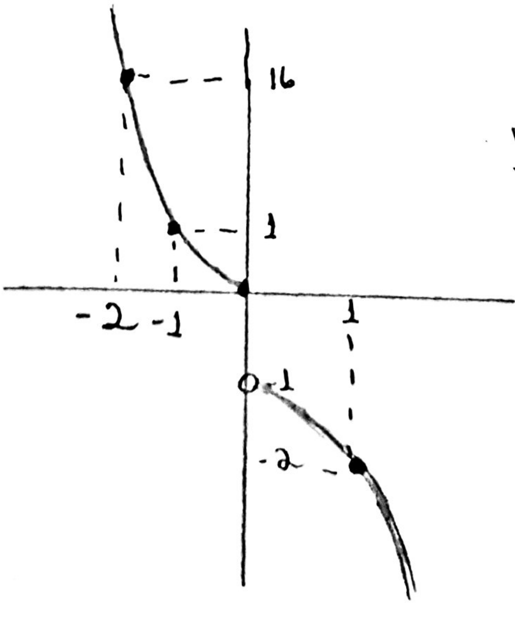
$-x^5$



$-1-x^5$ $g(x)$



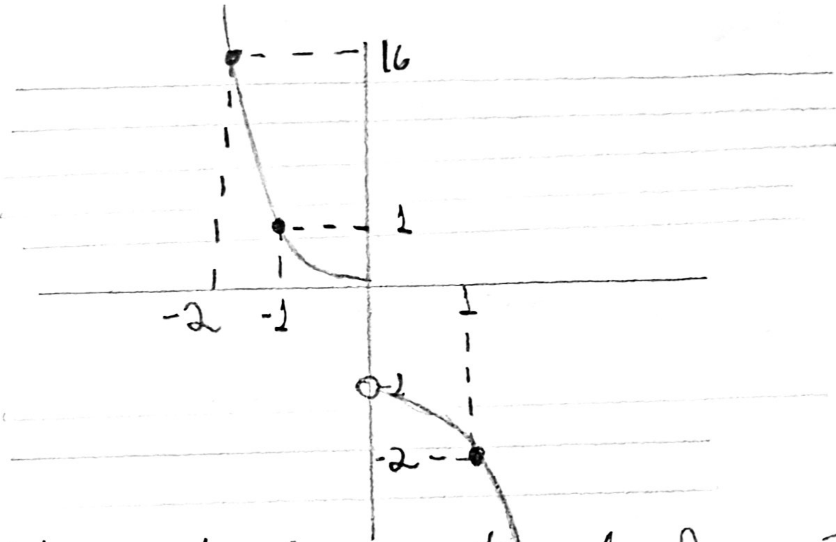
$f(x)$



b) $\mathrm{Dom}\, f(x) = \mathbb{R}$

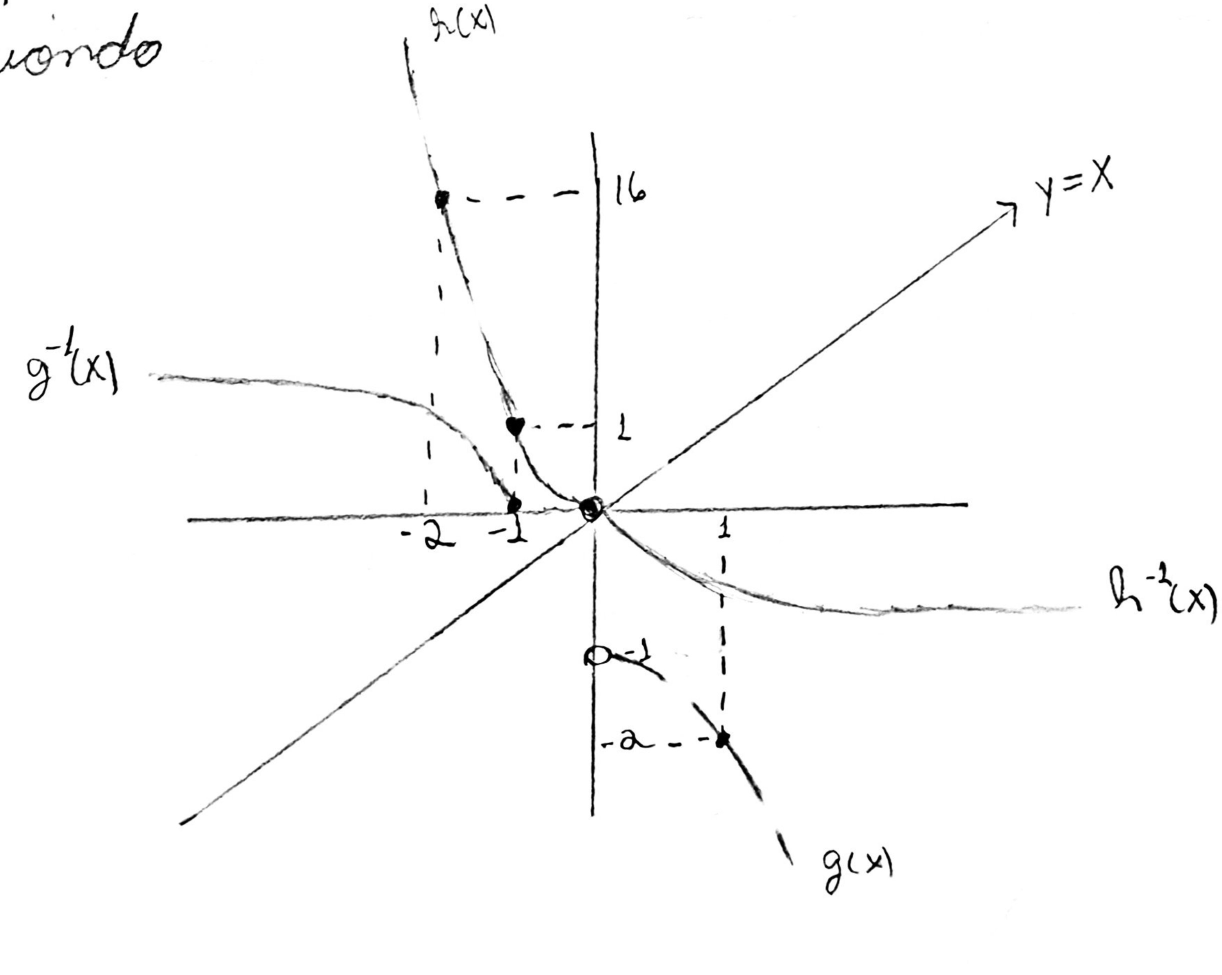
$\mathrm{Im}(f(x)) = (-\infty, -1) \cup [0, +\infty)$

c) f(x)



Traçando infinitas retas horizontais da função, percebemos que, para todo x existe apenas um elemento relacionando

D)



e) $f(x) = \begin{cases} x^4 & \text{se } x \leq 0 \to h(x) \\ -1-x^5 & \text{se } x > 0 \to g(x) \end{cases}$

* Para $x \leq 0$

$h(x)$: Dom $= (-\infty, 0] \to$ Im $= [0, +\infty)$

$h^{-1}(x)$: Dom $= [0, +\infty) \to$ Im $= (-\infty, 0]$

$h(x) = x^4$ $\quad y = x^4$ $\quad x = \pm\sqrt[4]{y}$. Como a imagem da $h^{-1}(x)$ é $(-\infty, 0]$, vamos considerar apenas a parte negativa, ou seja $h^{-1}(x) = -\sqrt[4]{x}$

. Para $x > 0$

$g(x)$: Dom $= (0, +\infty) \to$ Im $= (-\infty, 0)$

$g^{-1}(x)$: Dom $= (-\infty, 0) \to$ Im $= (0, +\infty)$

$g(x) = -1 - x^5$ $\quad y = -1 - x^5$ $\quad -x^5 = y + 1$ $\quad x^5 = -y - 1$

$x = \sqrt[5]{-y-1}$ $\quad g^{-1}(x) = \sqrt[5]{-x-1}$