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1. Calcula el dominio de las siguientes funciones:

(a) $f(x) = \dfrac{x + 13}{x^4 + x^3 - 3x^2 - 3x}$

Sol: $(-\infty, -\sqrt{3}) \cup (-\sqrt{3}, -1) \cup (-1, 0) \cup (0, \sqrt{3}) \cup (\sqrt{3}, \infty)$

(b) $f(x) = x^6 + x^2 - 2$

Sol: $\mathbb{R}$

(c) $f(x) = \dfrac{7x + 9}{x^3 + 8}$

Sol: $(-\infty, -2) \cup (-2, \infty)$

(d) $f(x) = \sqrt{\dfrac{x - 1}{x}}$

Sol: $(-\infty, 0) \cup [1, \infty)$

(e) $f(x) = \sqrt[3]{\dfrac{x - 1}{x}}$

Sol: $(-\infty, 0) \cup (0, \infty)$

(f) $f(x) = \sqrt[4]{\dfrac{x(x + 7)}{x^2 + 5x + 6}}$

Sol: $(-\infty, -3) \cup (-3, -2) \cup (-2, \infty)$

(g) $f(x) = \dfrac{x^3 - 6x^2 + 4x + 8}{x^3 - x^2 - 9x + 9}$

Sol: $(-\infty, -3) \cup (-3, 1) \cup (1, 3) \cup (3, \infty)$

(h) $f(x) = \dfrac{1}{4x^2 - 1}$

Sol: $\left(-\infty, -\dfrac{1}{2}\right) \cup \left(-\dfrac{1}{2}, \dfrac{1}{2}\right) \cup \left(\dfrac{1}{2}, \infty\right)$

(i) $f(x) = \dfrac{1}{\sqrt[4]{9 - x^2}}$

Sol: $(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$

(j) $f(x) = \dfrac{2x + 7}{\sqrt[3]{9 - x}}$

Sol: $(-\infty, 9) \cup (9, \infty)$

(k) $f(x) = \dfrac{x^2 - 5x + 6}{\sqrt{x^4 - 1}}$

Sol: $(-\infty, -1) \cup (1, \infty)$

(l) $f(x) = \sqrt{-2x^2 + 5x - 3}$

Sol: $\left[1, \dfrac{3}{2}\right]$

(m) $f(x) = \dfrac{x^2 - 3}{x^3 - 2x^2 - x + 2}$

Sol: $(-\infty, -1) \cup (-1, 1) \cup (1, 2) \cup (2, \infty)$

(n) $f(x) = \dfrac{5x^3 - 8}{1 + x + x^2}$

Sol: $\mathbb{R}$

(ñ) $f(x) = \dfrac{x - 1}{x^4 - 7x^2 - 144}$

Sol: $(-\infty, -4) \cup (-4, 4) \cup (4, \infty)$

(o) $f(x) = \dfrac{7x + 9}{81x^4 - 16}$

Sol: $\left(-\infty, -\dfrac{2}{3}\right) \cup \left(-\dfrac{2}{3}, \dfrac{2}{3}\right) \cup \left(\dfrac{2}{3}, \infty\right)$
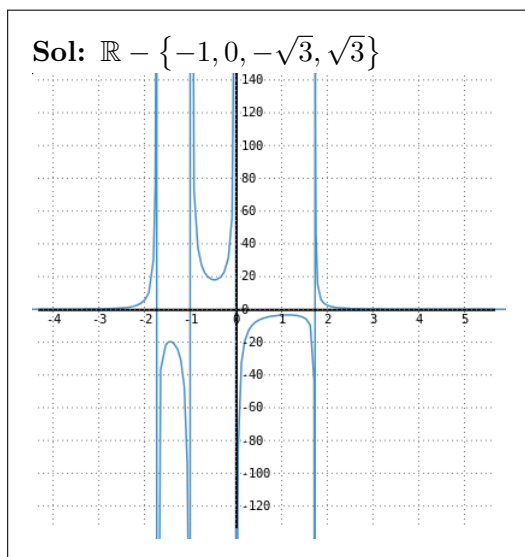
(p) $f(x) = \sqrt[3]{\dfrac{x^6 - 5x + 1}{x^2 - 4x + 4}}$

Sol: $(-\infty, 2) \cup (2, \infty)$

(q) $f(x) = \dfrac{\sqrt{x^2 - 4x - 5}}{x^2 + 2x + 1}$

Sol: $(-\infty, -1) \cup [5, \infty)$

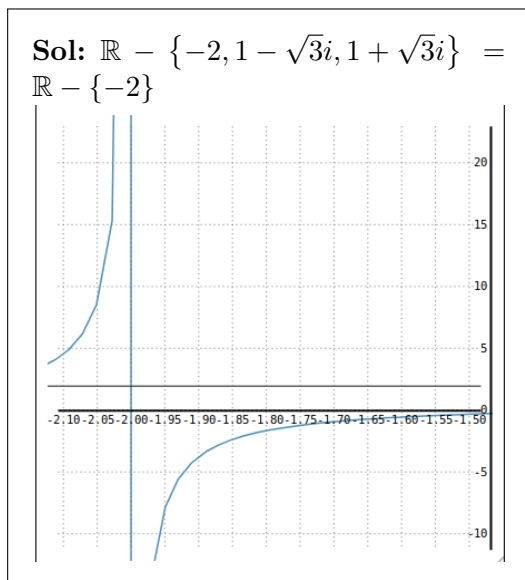2. Calcular el dominio de las siguientes funciones:

(a) $f(x) = \dfrac{x+13}{x^4 + x^3 - 3x^2 - 3x}$

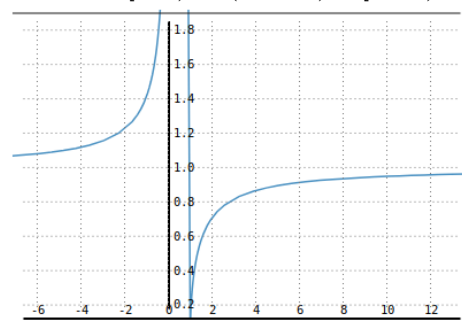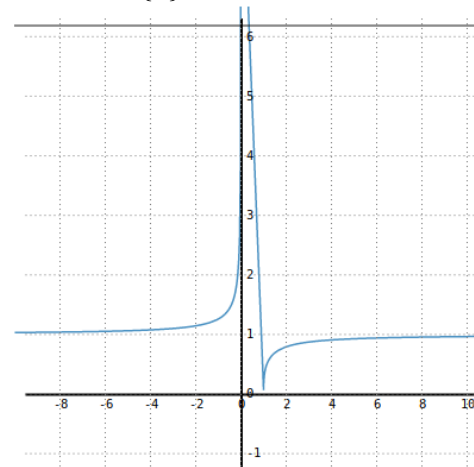**Sol:** $\mathbb{R} - \left\{-1, 0, -\sqrt{3}, \sqrt{3}\right\}$

(b) $f(x) = x^6 + x^2 - 2$

Sol: $\mathbb{R} - \emptyset$

(c) $f(x) = \dfrac{7x+9}{x^3 + 8}$

Sol: $\mathbb{R} - \left\{-2, 1 - \sqrt{3}i, 1 + \sqrt{3}i\right\} = \mathbb{R} - \{-2\}$

(d) $f(x) = \sqrt{\dfrac{x-1}{x}}$

Sol: $\mathbb{R} - [0,1) = (-\infty, 0) \cup [1, \infty)$

(e) $f(x) = \sqrt[3]{\dfrac{x-1}{x}}$
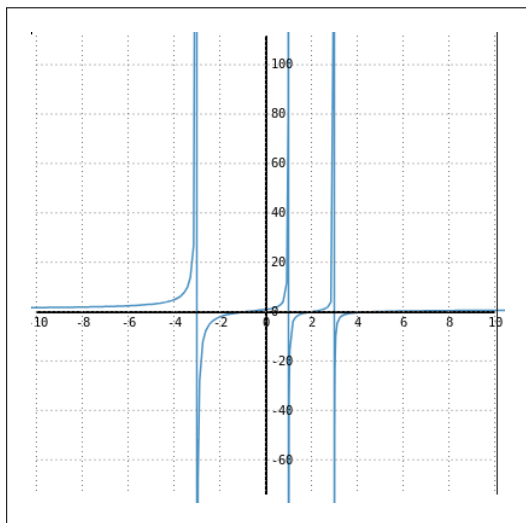
Sol: $\mathbb{R} - \{0\}$

(f) $f(x) = \sqrt[4]{\dfrac{x(x+7)}{x^2 + 5x + 6}}$

Sol:

(g) $f(x) = \dfrac{x^3 - 6x^2 + 4x + 8}{x^3 - x^2 - 9x + 9}$

Sol: $\{-3, 1, 3\}$

Sol:

(l) $f(x) = \sqrt{-2x^2 + 5x - 3}$

Sol:

(m) $f(x) = \dfrac{x^2 - 3}{x^3 - 2x^2 - x + 2}$

Sol:

(n) $f(x) = \dfrac{5x^3 - 8}{1 + x + x^2}$

Sol:

(h) $f(x) = \dfrac{1}{4x^2 - 1}$

(ñ) $f(x) = \dfrac{x - 1}{x^4 - 7x^2 - 144}$

Sol:

Sol:

(o) $f(x) = \dfrac{7x + 9}{81x^4 - 16}$

(i) $f(x) = \dfrac{1}{\sqrt[4]{9 - x^2}}$

Sol:

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(p) $f(x) = \sqrt[3]{\dfrac{x^6 - 5x + 1}{x^2 - 4x + 4}}$

(j) $f(x) = \dfrac{2x + 7}{\sqrt[3]{9 - x}}$

Sol:

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(q) $f(x) = \dfrac{\sqrt{x^2 - 4x - 5}}{x^2 + 2x + 1}$

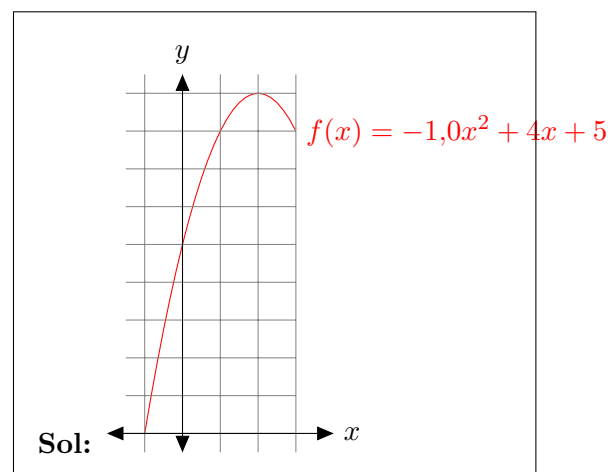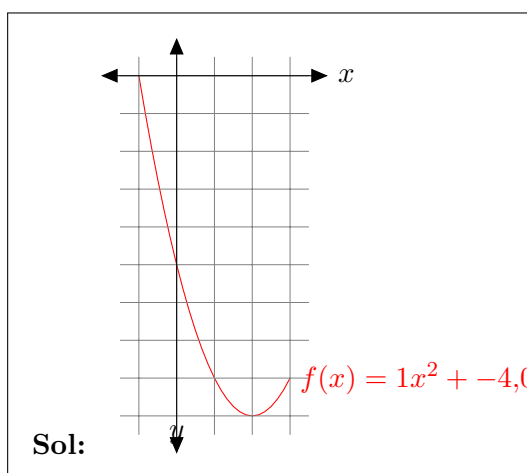(k) $f(x) = \dfrac{x^2 - 5x + 6}{\sqrt{x^4 - 1}}$

Sol:

3. Dadas las siguientes funciones, dadas por sus gráficas, obtén sus propiedades:
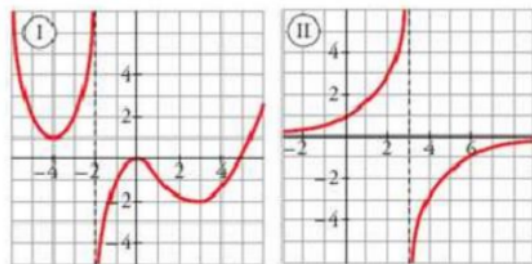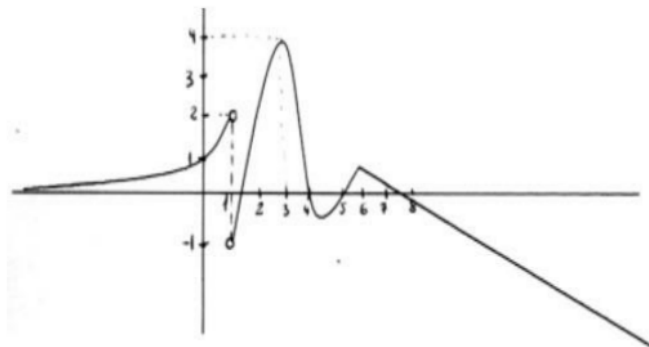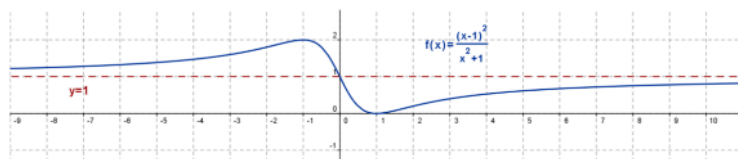
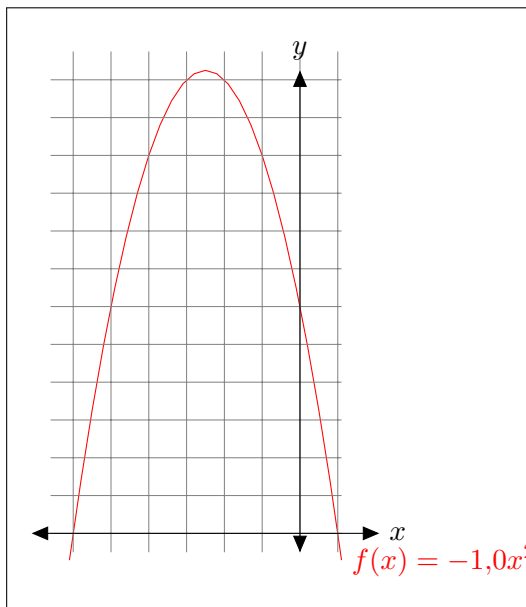4. Representa las siguientes funciones, indicando sus propiedades:
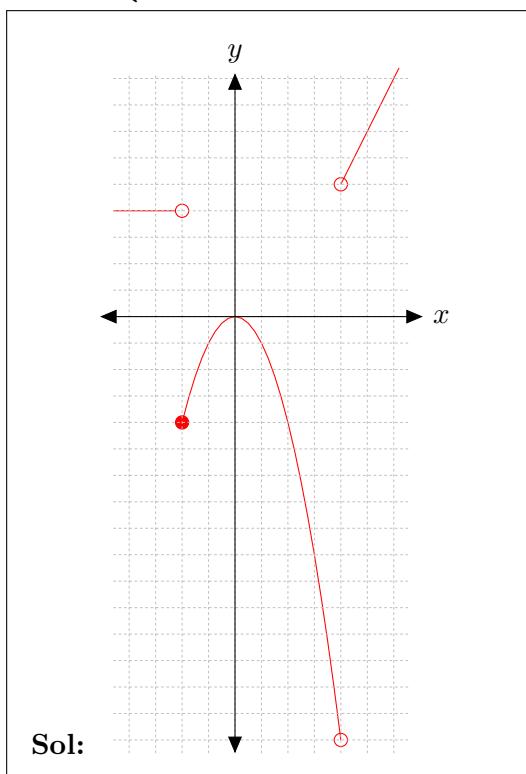
(a) $y = x^2 - 4x - 5$

$f(x) = 1x^2 + -4{,}0x + -5{,}0$

Sol:

$f(x) = -1{,}0x^2 + 4x + 5$

Sol:

(c) $y = -x^2 - 5x + 6$

Sol:

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

$f(x) = -1{,}0x^2 + -5{,}0x + 6$

(e) $\quad f(x) = \begin{cases} 2x & \text{si} & x < -3 \\ x^2 - 2x - 8 & \text{si} & -3 \leq x \leq 3 \\ 2x - 3 & \text{si} & x \geq 3 \end{cases}$

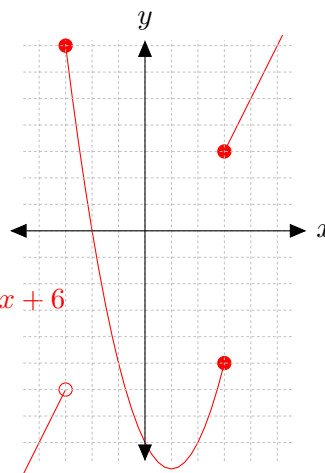**Sol:** Nótese, que en este caso la definición no sería una función ($x = 3$ tiene dos imágenes)

(d) $\quad f(x) = \begin{cases} 4 & \text{si} & x < -2 \\ -x^2 & \text{si} & -2 \leq x < 4 \\ 2x - 3 & \text{si} & x \geq 4 \end{cases}$

Sol:

(f) $\quad f(x) = \begin{cases} x + 1 & \text{si} & x \leq 0 \\ x^2 - 4x + 3 & \text{si} & x > 0 \end{cases}$

Sol: