Punto 1.

a.) EN X=4, Es un función continua en x=4.

b.) EN X=-1 Existe discontinuidad esencial por falto finito en x=-1.

c.) EN X=5 Existe discontinuidad removible en x=5.

d.) EN X=0 La función es continua, en X=2 existe discontinuidad esencial por salto infinito en x=2.

Punto 2.

a.)

$$\lim_{x \to 2^-} ax - 3 = a(2) - 3 = 2a - 3$$

$$\lim_{x \to 2^+} 3 - x + 2x^2 = 3 - (2) + 2(2)^2 = 9$$

$$\lim_{x \to 2^-} f(x) = \lim_{x \to 2^+} f(x)$$

$$2a - 3 = 9$$

$$2a = 12$$

$$a = 6$$

$$\lim_{x \to 2^-} 6x - 3 = 6(2) - 3 = 12 - 3 = 9$$

La función es continúa en el punto x = 2.

b.)

$$\lim_{x \to 4^-} 1 - 3x = 1 - 3(4) = -11$$

$$\lim_{x \to 4^+} ax^2 + 2x - 3 = a(4)^2 + 2(4) - 3 = 16a + 5$$

$$-11 = 16a + 5$$

$$-16 = 16^{\text{ª}}$$

$$a = -1$$

$$\lim_{x \to 4^+} a - +2x - 3 = 16(-1) + 5 = -11$$

La función es continúa en el punto x = 4.

c.)

$$\lim_{x \to 1^-} \frac{x + 2}{x - 4} = \frac{1 + 2}{1 - 4} = \frac{3}{-3} = -1$$

$$\lim_{x \to 1^+} \frac{ax - 3}{5 + ax^2} = \frac{a(1) - 3}{5 + a(1)^2} = \frac{a - 3}{5 + a}$$

$$-1 = \frac{a-3}{5+a}$$

$$-5 - a = a - 3$$

$$-5 + 3 = a + a$$

$$-2 = 2a$$

$$a = -1$$

$$\lim_{x \to 1^+} \frac{-x-3}{5-x^2} = \frac{-1-3}{5-1} = -1$$

Punto 3.

a.)

$$y' = x + 6$$

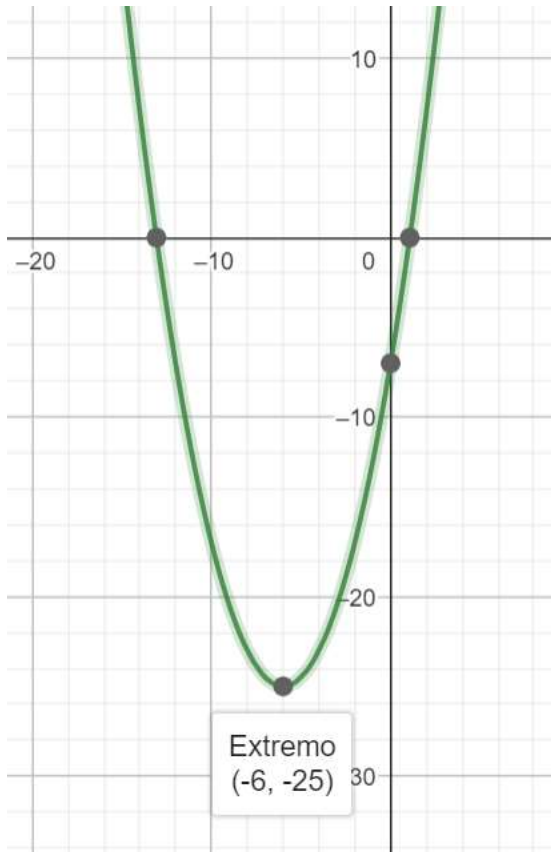
$$0 = x + 6$$

$$x = -6, Punto\ critico$$

$$y'' = 1, en\ x = 6\ es\ un\ punto\ minimo.$$

El intervalo de decrecimiento es de (-∞,6)u(6,∞)

Es Concava hacia arriba

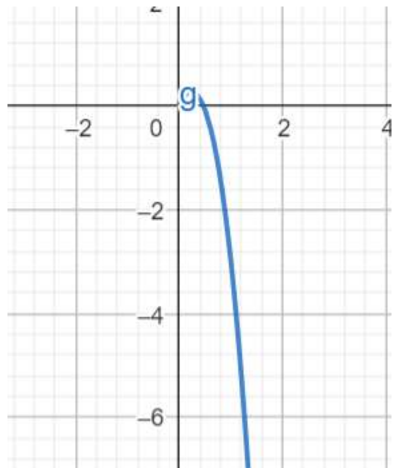


b.)

$$y' = \frac{2}{3\sqrt[3]{x}} + 10x^{\frac{3}{2}}$$

$$\frac{2}{3\sqrt[3]{x}} + 10x^{\frac{3}{2}} = 0, \textit{No existe solucion en los numeros reales}$$

La grafica decrece de [0, ∞)



c.)

$$y' = 1 - \frac{3}{2\sqrt{x}} + \frac{2}{3\sqrt[3]{x^2}}$$

$$1 - \frac{3}{2\sqrt{x}} + \frac{2}{3\sqrt[3]{x^2}} = 0$$

$$1 \cdot\ 6\sqrt{x\sqrt[3]{x^2}} - \frac{3}{2\sqrt{x}} \cdot\ 6\sqrt{x\sqrt[3]{x^2}} + \frac{2}{3\sqrt[3]{x^2}} \cdot\ 6\sqrt{x\sqrt[3]{x^2}} = 0$$

$$6\sqrt{x\sqrt[3]{\left(\sqrt{x}\right)^4}} - 9\sqrt[3]{\left(\sqrt{x}\right)^4} + 4\sqrt{x} = 0$$

$$6u\sqrt[3]{u^4} - 9\sqrt[3]{u^4} + 4u = 0$$

$$u^4 = \frac{64u^3}{216u^3 - 972u^2 + 1458u - 729}$$

$$u^4(27u(2u-3)^3 + 64) = 0$$

$$u = 0$$

$$27u(2u-3)^3 + 64 = 0$$

$$u = 0\ ;\ u = 0.1104\ ;\ u = 0.7738$$

$$\sqrt{x} = 0\ ;\ \sqrt{x} = 0.1104\ ;\ \sqrt{x} = 0.7738$$

$$x = 0.012\ ;\ x = 0.5988$$

$$y'' = \frac{3}{4x^{\frac{3}{2}}} - \frac{4}{9x^{\frac{5}{3}}}$$

$$0 = \frac{3}{4x^{\frac{3}{2}}} - \frac{4}{9x^{\frac{5}{3}}}$$

$$0 = 27x^{\frac{1}{6}} - 16$$

$$x^{\frac{1}{6}} = \frac{16}{27}$$

$$x = 0.043, Punto\ de\ inflexion$$

$$y''(0.012) = \frac{3}{4(0.012)^{\frac{3}{2}}} - \frac{4}{9(0.012)^{\frac{5}{3}}} = -136.06, En\ x = 0.043\ es\ un\ Maximo$$

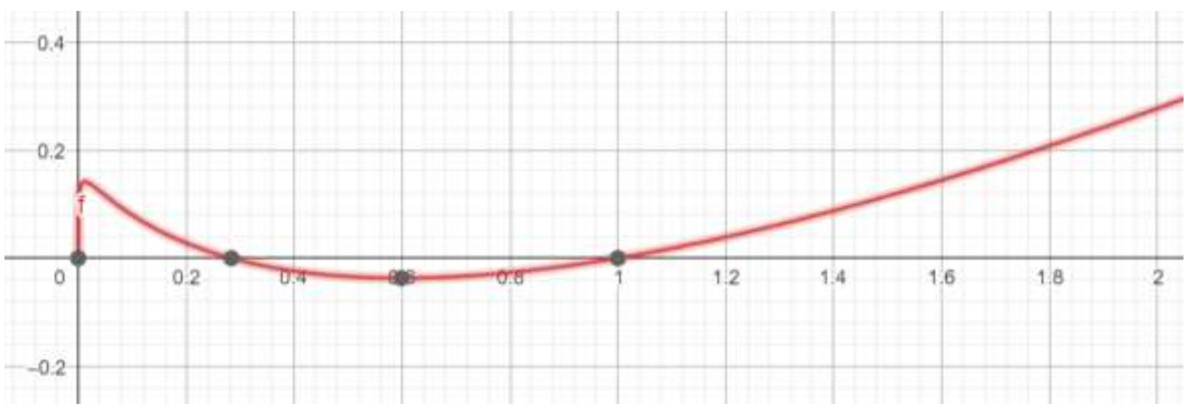
$$y''(0.012) = \frac{3}{4(0.5988)^{\frac{3}{2}}} - \frac{4}{9(0.5988)^{\frac{5}{3}}} = 0.5737, En\ x = 0.5988\ es\ un\ Mínimo$$

$$Crece = (0, 0.012)u(0.5988, \infty)$$

$$Decrece = (0.012\ , 0.5988)$$

$$Concava\ en = (0,0.043)$$

$$Convexa\ en = (0.043, \infty)$$



d.)

$$y' = -14t^{-3} + \frac{3}{t^4}$$

$$0 = -14t^{-3} + \frac{3}{t^4}$$

$$0 = -14t + 3$$

$$t = \frac{3}{14}$$

$$y'' = \frac{42}{t^4} - \frac{12}{t^5}$$

$$0 = \frac{42}{t^4} - \frac{12}{t^5}$$

$$0 = 42t - 12$$

$$t = \frac{2}{7}$$

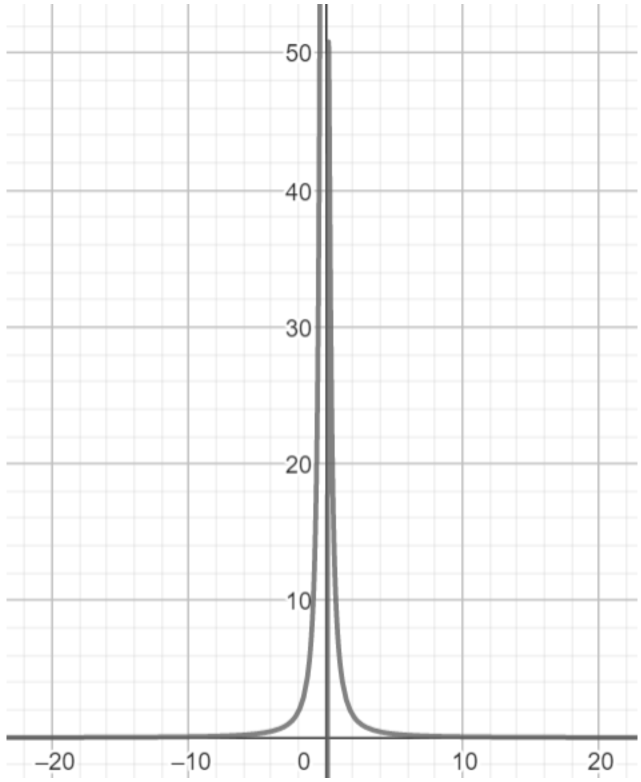
$$y''(\frac{3}{14}) = \frac{42}{(\frac{3}{14})^4} - \frac{12}{(\frac{3}{14})^5} = -6639.802, por\ lo\ tanto\ \frac{3}{14}\ es\ un\ maximo$$

$$Crece = (-\infty, 0)u(0, \frac{3}{14})$$

$$Decrece = (\frac{3}{14}, \infty)$$

$$Concava\ en = (0, \frac{2}{7})$$

$$Convexa\ en = (\frac{2}{7}, \infty)$$



e.)

$$y = (x^2+1)\left(x + 5x^{\frac{3}{4}} + \frac{1}{x}\right) = x^3 + 5x^{\frac{11}{4}} + 2x + 5x^{\frac{3}{4}} + \frac{1}{x}$$

$$y' = 3x^2 + \frac{55x^{\frac{7}{4}}}{4} + 2 + \frac{15}{4x^{\frac{1}{4}}} - \frac{1}{x^2}$$

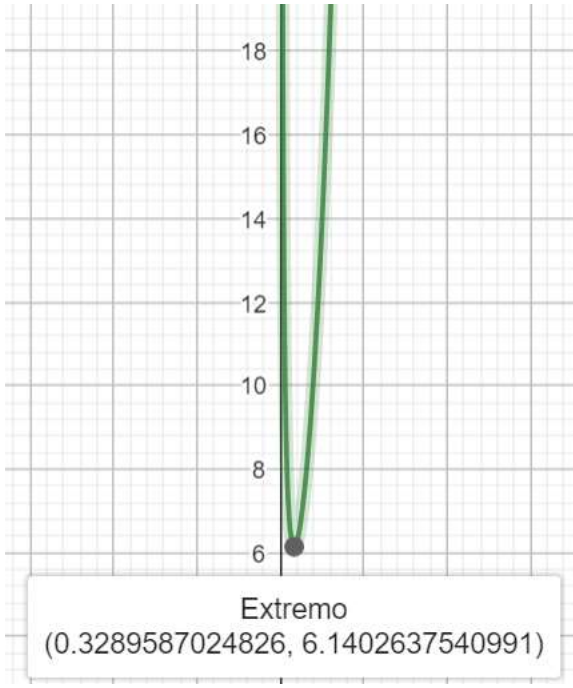
$$3x^2 + \frac{55x^{\frac{7}{4}}}{4} + 2 + \frac{15}{4x^{\frac{1}{4}}} - \frac{1}{x^2} = 0$$

$$x = 0.3289$$

$$Crece = (0.3289\,, \infty)$$

$$Decrece = (0, 0.3289)$$

$$Convexa\ en = (0{,}0.3289)$$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