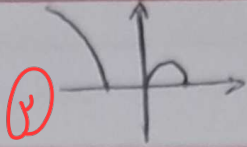


f(x) = sqrt(x(1-x)) D\_f = (-infinity, -1] union [0, 1]



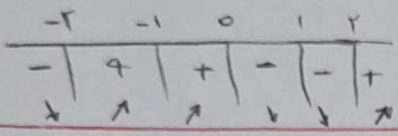
max = m = 1 min = n = 0 K = 3

k + m + n = 4

f(x) = sqrt(x) + sqrt(a-2x) => f'(x) = 1/(2\*sqrt(x)) - 2/(2\*sqrt(a-2x)) = 0 => sqrt(a-2x) = 2\*sqrt(x) => a-2x = 4x => a = 6x => x = a/6

f(0) = sqrt(a) f(a/6) = sqrt(a/6) min f(a/6) = sqrt(a/6) + sqrt(2a/3) = sqrt(a)/sqrt(6) + sqrt(2a/3) = sqrt(a)/sqrt(6) + sqrt(2a/3) = sqrt(a) \* (1/sqrt(6) + sqrt(2/3)) = sqrt(a) \* (1/sqrt(6) + sqrt(4/6)) = sqrt(a) \* (1/sqrt(6) + 2/sqrt(6)) = sqrt(a) \* (3/sqrt(6)) = sqrt(a) \* (sqrt(6)/2) => a = 4 [a] = 4

f(x) = x^r / (x^r - 1) |x^r - 1| => { x^r(x^r - 1) / (x^r - 1)^2 for x >= 1, -x^r(x^r - 1) / (x^r - 1)^2 for x < 1 => f(x) = { (2x - x^2 + 1) / (x^2 - 1)^2 for x >= 1, (-2x + x^2 - 1) / (x^2 - 1)^2 for x < 1



L = ax^3 + bx^2 + cx + d x=0 => y=0 => d=0 x=1 => y=a+b+c=1 => 2a+2b=2 y' = 3ax^2 + 2bx + c x=0 => y'=0 => c=0 x=1 => y' = 2a+2b=0 => b=2, a=-2 => ab=-4

f(x) = x|2x^3| = x|sqrt(3)+x| |sqrt(3)-x| min => x = -1/2 f(-1/2) = -9/8 (جواب پایین صفت)

L = x^2(x+3ax^2+b) x=-1 => L = -x^2 + 3ax + b => L = 1 - 3a + b = 1 => b = 3a y' = -2x^2 + 3a => y' = 3a - 2 = 0 => a = 1 b/a = 3 (جواب پایین صفت)

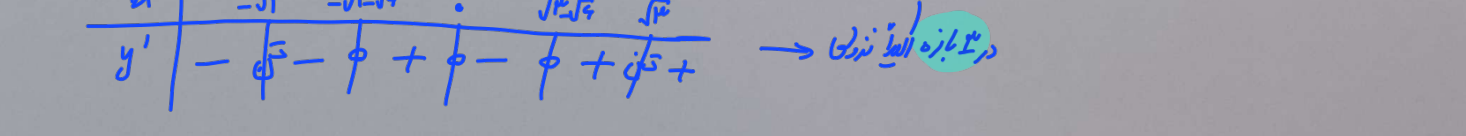
L = (ax+3) / ((a+1)x + (a-1)) y = 3/2 x^2 + x + 5/4 y' = 3x+1 = 0 => x = -1/3 1-a = -1/3 => 2a = 2 => a = 2 L = (2x+3) / (3x+2) = 0 => 2x+3 = 0 => x = -3/2

L = (bx^2+7) / (2x^2+ax+1) جانب اقل = b/2 = 2 => b = 4 جانب اقل = 4x^2 + ax + 1 = 0 => 1 - a/2 + 1 = 2 - a/2 = 0 => a = 4 b/a = 1

f(x) = x^4 / (x^4 - 1) => f'(x) = (4x^3 - 4) / (x^4 - 1)^2 -2 -sqrt(2) sqrt(2) 2 sqrt(2) 2 (جواب پایین صفت)

f(x) = (x^4 - 3) / (x^4 - 3) => f'(x) = (4x^3 - 4x^3) / (x^4 - 3)^2 -sqrt(3) -sqrt(3) -1 0 1 sqrt(3) sqrt(3) (جواب پایین صفت)

12u^3 + 4u = 0 => 4u(3u^2 + 1) = 0 => u = 0 u^2 = -3/3 => u^2 = -1 => u = +/- i



$$f(x) = \begin{cases} x(4-x^2) & ; -\sqrt{4} < x < \sqrt{4} \\ x(x^2-4) & ; x > \sqrt{4}, x < -\sqrt{4} \end{cases} \rightarrow f(x) = \begin{cases} -x^3+4x & ; -\sqrt{4} < x < \sqrt{4} \\ x^3-4x & ; x > \sqrt{4}, x < -\sqrt{4} \end{cases}$$

$$\rightarrow f'(x) = \begin{cases} -3x^2+4 & ; -\sqrt{4} < x < \sqrt{4} \\ 3x^2-4 & ; x > \sqrt{4}, x < -\sqrt{4} \end{cases}$$

$$\begin{aligned} f'(-\sqrt{4}) &= 4 & f'_+(-\sqrt{4}) &= -4 \\ f'(\sqrt{4}) &= -4 & f'_+(\sqrt{4}) &= 4 \end{aligned} \rightarrow \begin{array}{l} \text{تابع در } \sqrt{4}, -\sqrt{4} \\ \text{مشتق به سمت راست} \end{array}$$

$$f'(x) = 0 \rightarrow 4 - 3x^2 = 0 \rightarrow x^2 = 1 \rightarrow x = \pm 1$$

نقطه بحرانی  $\rightarrow$

$$\begin{cases} x = -1, 5 \rightarrow f(-1, 5) = -1, 125 \\ x = -1 \rightarrow f(-1) = -2 \\ x = 1 \rightarrow f(1) = 2 \\ x = \sqrt{4} \rightarrow f(\sqrt{4}) = 0 \end{cases} \rightarrow \begin{array}{l} \min \\ \text{مطلق} \\ \text{در بازه} \end{array} = -2$$

$$f(-1) = 1 \rightarrow 1 + 3a + b = 1 \rightarrow 3a + b = 0 \quad (I)$$

$$\begin{cases} f'(-1) = 0 \\ x = -1 < 0 \rightarrow f(x) = -x^3 + 3ax^2 + b \rightarrow f'(x) = -3x^2 + 6ax \end{cases} \quad \frac{b}{a} = \frac{\frac{4}{3}}{-\frac{1}{3}} = -4$$

$$\rightarrow f'(-1) = -3 - 6a = 0 \rightarrow \boxed{a = -\frac{1}{2}} \xrightarrow{(I)} \boxed{b = \frac{3}{2}}$$

$$f(x) = \frac{x^4}{x^3-1} \rightarrow f'(x) = \frac{4x^3(x^3-1) - x^4(3x^2)}{(x^3-1)^2} = \frac{4x^6 - 3x^6 - 4x^6}{(x^3-1)^2} < 0$$

$$x \neq 1 \rightarrow 4x^6 - 3x^6 < 0 \rightarrow x^6(4-3x) < 0 \rightarrow 0 < x < \sqrt[6]{3}, x \neq 1$$

تابع در دو بازه  $(0, 1)$  و  $(1, \sqrt[6]{3})$   $\leftarrow$  ابتدا نزدیک

$$(0, 1) \rightarrow \text{طرز بازه} = 2$$

$$(1, \sqrt[6]{3}) \rightarrow \text{طرز بازه} = 2(\sqrt[6]{3}-1) < 2 \rightarrow \begin{array}{l} \min \\ \text{طرز بازه} \end{array} = 2(\sqrt[6]{3}-1)$$