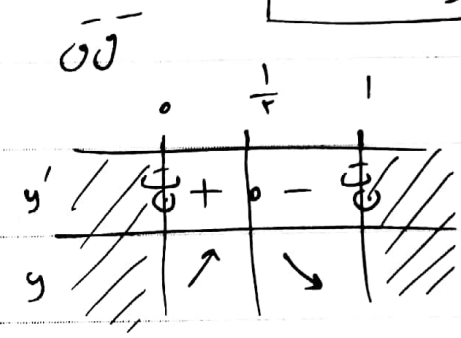


$$f(x) = \sqrt{x(1-|x|)}$$

$$f(x) = \begin{cases} \sqrt{x-x^2} & x \geq 0 \\ \sqrt{x+x^2} & x < 0 \end{cases} \quad D_f = [0, 1] \xrightarrow{\wedge} [0, 1]$$

$$D_f = (-\infty, -1] \cup [0, +\infty) \xrightarrow{\wedge} (-\infty, -1]$$

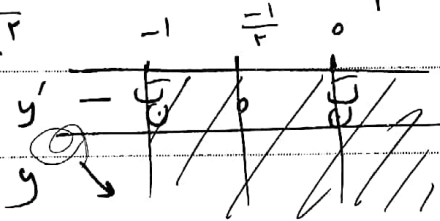
$$f'(x) = \frac{1-2x}{2\sqrt{x-x^2}} = 0 \rightarrow x = \frac{1}{2} \quad \text{نقطه Max}$$



Min نیست ندارد $\sqrt{\quad}$

نقطه بحرانی $\leftarrow \frac{1}{2}, 1, 0$

$$\frac{1+2x}{2\sqrt{x+x^2}} = 0 \rightarrow x = -\frac{1}{2} \quad \text{نقطه Min} \rightarrow (-\infty, -1] \text{ ندارد}$$



Max و Min نیست \rightarrow

ندارد $\sqrt{\quad}$

$$x = -1 \leftarrow \text{نقطه بحرانی}$$

$$k+m+n = 4, 5 \quad \text{جواب}$$

$$\left. \begin{aligned} \text{تعداد کل نقطه بحرانی} &= k = m = n \\ \frac{1}{2} = m &= \text{نقطه Max} \\ \frac{-1}{2} = n &= \text{نقطه Min} \end{aligned} \right\}$$

$$f(x) = \sqrt{x} + \sqrt{a-2x} \quad \left. \begin{aligned} x \geq 0 \\ x \leq \frac{a}{2} \end{aligned} \right\} \rightarrow D_f = [0, \frac{a}{2}] - 2$$

$$f'(x) = \frac{1}{2\sqrt{x}} + \frac{-2}{2\sqrt{a-2x}} = \frac{\sqrt{a-2x} - \sqrt{x}}{\sqrt{x}\sqrt{a-2x}}$$

سؤا

$$f'(x) = 0 \rightarrow \sqrt{a-2x} - 2\sqrt{x} = 0 \rightarrow \sqrt{a-2x} = 2\sqrt{x}$$

$$\rightarrow a - 2x = 4x \rightarrow 4x = a \rightarrow \boxed{x = \frac{a}{4}}$$

$$\begin{cases} x = 0 \rightarrow f(x) = \sqrt{a} \end{cases}$$

$$\begin{cases} x = \frac{a}{4} \rightarrow f(x) = \sqrt{\frac{a}{4}} \rightarrow f(x) = \frac{\sqrt{4}}{4} \sqrt{a} \end{cases}$$

$$\begin{cases} x = \frac{a}{4} \rightarrow f(x) = \sqrt{\frac{a}{4}} + \sqrt{\frac{4a}{4}} \rightarrow f(x) = \frac{\sqrt{4}}{4} \sqrt{a} \end{cases}$$

$$\text{Max} \times \text{Min} = \sqrt{4} \rightarrow \frac{\sqrt{4}}{4} \sqrt{a} \times \frac{\sqrt{4}}{4} \sqrt{a} = \sqrt{4}$$

$$\frac{a}{4} = 1 \rightarrow \boxed{a = 4} \rightarrow [a] = \textcircled{4}$$

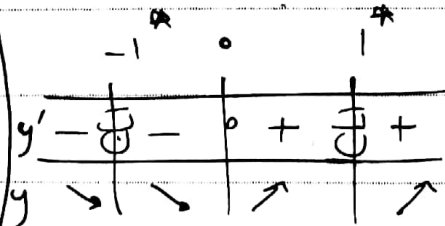
جواب

$$f(x) = \frac{x^r}{x^r - 1} \quad | \quad x^r - 1 \quad - \infty$$

$$f(x) = \begin{cases} \frac{x^r (x^r - 1)}{x^r - 1} & D_f = (-\infty, -1] \cup [1, +\infty) \end{cases}$$

$$\begin{cases} \frac{x^r (1 - x^r)}{x^r - 1} & D_f = [-1, 1] - \{ \pm 1 \} \end{cases}$$

$$f'(x) = \begin{cases} \frac{rx^{r-1} - rx^{r-1} + 1}{(x^r - 1)^2} = \frac{rx^{r-1} - rx^{r-1} + 1}{(x^r - 1)^2} \quad \text{صفت} \end{cases}$$



$$x = 0 \rightarrow \text{صفت}$$

در بازه $(-\infty, -1] \cup [1, +\infty)$

نقطه

$$\frac{-2n^0 + 2n^2 - 1n}{(n^2-1)^2} = \frac{-2n(n^2 - 2n^2 + 1)}{(n^2-1)^2}$$

y'	$+$	$\frac{1}{2}$	$+$	0	$+$	$-\frac{1}{2}$	$-$
y	\nearrow	\nearrow	$ $	\searrow	$ $	\searrow	\searrow

$n = 0$

$\sigma \bar{\sigma} \rightarrow [-2, 2]$ در بازه
 $\sigma, \bar{\sigma}$

← بین تابع در مجموع $\frac{1}{2}$ استمرکس دارد ✓

$$y = an^2 + bn^2 + cn + d$$

نقطه
البتعم
نقطه

$$f(0) = 0 \quad f(1) = 1 \rightarrow \boxed{a + b + c = 1}$$

$$\hookrightarrow \boxed{d = 0}$$

$$\downarrow \boxed{a + b = 1}$$

$$f'(0) = 0 \quad f'(1) = 0 \quad y' = 2an^2 + 2bn + c$$

$$\hookrightarrow \boxed{c = 0} \quad \hookrightarrow \begin{cases} 2a + 2b = 0 \\ a + b = 1 \end{cases} \rightarrow \begin{cases} 2a + 2b = 0 \\ -2a - 2b = -2 \end{cases}$$

$b = 3$

$a = -2$

$$ab = \boxed{-6} \quad \text{جواب}$$

$$f(x) = x |3 - x^2|$$

$$f(x) = \begin{cases} 3x - x^3 & [-\sqrt{3}, \sqrt{3}] \\ x^3 - 3x & (-\infty, -\sqrt{3}] \cup [\sqrt{3}, +\infty) \end{cases}$$

نکات

$$f'(x) = \begin{cases} r - rx^r = 0 \rightarrow x = \pm 1 \\ rx^r - r = 0 \rightarrow x = \pm 1 \end{cases}$$

مجموعه جواب: $[\sqrt{r}, +\infty) \cup (-\infty, -\sqrt{r}]$

$$\begin{cases} x=1 \rightarrow f(x) = r \\ x=-1 \rightarrow f(x) = -r \\ x=\sqrt{r} \rightarrow f(x) = 0 \\ x=-\sqrt{r} \rightarrow f(x) = \frac{-r}{r} \end{cases}$$

$-r$ = Min
جواب

$$y = a^r |x| + rax^r + b$$

$$x = -1$$

$$y = -x^r + rax^r + b$$

$$y' = -rx^r + 4ax \rightarrow f'(-1) = 0$$

$$\rightarrow -r - 4a = 0 \rightarrow a = \frac{-1}{r}$$

$$f(-1) = 1 \rightarrow -(-1)^r + r\left(\frac{-1}{r}\right)(-1)^r + b = 1$$

$$1 - \frac{r}{r} + b = 1 \rightarrow b = \frac{r}{r}$$

$$\frac{b}{a} = \frac{\frac{r}{r}}{\frac{-1}{r}} = -r$$

جواب

نکات

$$y = \frac{r}{r} n^r + n + \frac{a}{r} \rightarrow \text{Min} \left| \begin{array}{l} -b \\ ra = \frac{-1}{r} \\ \frac{r}{r} \end{array} \right. - \checkmark$$

$$y = \frac{an + r}{(a+1)n + (a-1)} \rightarrow \text{جانب مافم} : n = \frac{1-a}{1+a}$$

$$\text{جانب افتر} \quad y = \frac{a}{a+1}$$

$$\left\{ \begin{array}{l} \frac{1-a}{1+a} = \frac{-1}{r} \rightarrow r - ra = -1 - a \\ ra = r - 1 - a \end{array} \right.$$

$$ra = r - 1 - a \rightarrow \boxed{a = r}$$

$$\frac{a}{a+1} = \frac{r}{r} \rightarrow ra = ra + r$$

$$y = \frac{rn + r}{rn + 1} = 0 \rightarrow \boxed{n = \frac{-r}{r}} \text{ جواب}$$

$$y = \frac{bn^r + r}{en^r + an + 1} \quad \left| \begin{array}{l} \frac{1}{r} \\ \frac{r}{r} \end{array} \right. - \checkmark$$

$$\text{جانب افتر} \quad \lim_{n \rightarrow +\infty} \frac{b}{e} = r \rightarrow \boxed{b = 12}$$

$$\text{جانب مافم} \rightarrow \left(\frac{-1}{r} \right)^r + a \left(\frac{-1}{r} \right) + 1 = 0$$

$$1 + 1 - \frac{a}{r} = 0 \rightarrow \boxed{a = r}$$

$$\frac{b}{a} = \boxed{r}$$

جواب

نقطه

$$y = \frac{x^r}{x^r - 1} \rightarrow y' = \frac{r x^{r-1} (x^r - 1) - (x^r)(r x^{r-1})}{(x^r - 1)^2} \quad 9$$

$$y' = \frac{r x^r - r^2 x^r - r x^r}{(x^r - 1)^2} \rightarrow y' = \frac{x^r - r^2 x^r}{(x^r - 1)^2}$$

$$y' = \frac{x^r (x^r - r^2)}{(x^r - 1)^2}$$

y'	+	-	0	-	+
y	↗	↘	↘	↘	↗

نقطه های بحرانی $\rightarrow (0, 1), (r, \sqrt[r]{r^2})$
در آن نزول است

حداقل طول این بازه ها $\rightarrow \boxed{\sqrt[r]{r^2} - 1}$ جواب

$$f(x) = \frac{x^2 - 3}{x^2 - 3} \quad x \in (-2, 2) \quad -10$$

$$f'(x) = \frac{2x(x^2 - 3) - (x^2 - 3)(2x)}{(x^2 - 3)^2}$$

نقطه ها: $\pm \sqrt{6}$

$$f'(x) = \frac{2x^2 - 12x^2 + 6x}{(x^2 - 3)^2} \rightarrow \frac{2x(x^2 - 6x + 3)}{(x^2 - 3)^2}$$

	-2	$-\sqrt{6}$	0	$3 - \sqrt{6}$	$\sqrt{6}$	2	$\sqrt{6} + 3$
y'	-	-	+	-	-		
y	↘	↘	↗	↘	↘		

در $\frac{2}{3}$ بازه \rightarrow
الدا نزول است