پردیس ایرانپور

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$f(x) = 1 - \frac{a}{x}$ $\quad f(1) = 1 - a$ $\quad f(3) = 1 - \frac{a}{3}$ $\quad \frac{1 - \frac{a}{3} - (1-a)}{3-1} = \frac{\frac{2a}{3}}{2} = \frac{a}{3}$

$f'(x) = \frac{a}{x^2}$ $\quad \frac{a}{x^2} = \frac{a}{3} \rightarrow x = \pm\sqrt{3}$

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$2ax^2 - 5x + 18a = x \rightarrow 2ax^2 - 6x + 18a = 0 \rightarrow ax^2 - 3x + 9a = 0$

$x = \frac{3 \pm \sqrt{9 - 36a^2}}{2a}$ $\quad 36a^2 = 9 \rightarrow a^2 = \frac{1}{4} \rightarrow a = \pm\frac{1}{2} \rightarrow a = -\frac{1}{2}$

$y' = 4ax - 5 = 1 \rightarrow 4ax = 6$ $\quad x = \frac{6}{4a} \rightarrow a < 0$

$x < 0 \leftarrow$ ناحیه ۳

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$y = x^3 - 12x + 2$ $\quad y' = 3x^2 - 12$ $\quad 3x^2 - 12 = 0 \rightarrow x^2 = 4 \rightarrow x = \pm 2$

x	$-\infty$	-2	2	$+\infty$
y'	+	−	+	
y	↗	↘	↗	

min $\left|^{2}_{8-24+2=-14}\right.$ $\quad \left|^{2}_{-14}\right.$

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$y' = 3x^2 + 2ax - 2b$ $\xrightarrow{x=0} y' = -2b = 0 \rightarrow b = 0$

$x = -2 \rightarrow y' = 12 - 4a = 0 \rightarrow a = 3$

$y' = 3x^2 + 6x$ $\quad y = x^3 + 3x^2 - 4$

x		-2	0	
y'	+	−	+	
y	↗	↘	↗	

$\left|^{-2}_{0}\right.$ $\quad -4$ $\quad \left|^{0}_{-4}\right.$

$\sqrt{(-2-0)^2 + (0+4)^2} = \sqrt{4+16} = 2\sqrt{5}$

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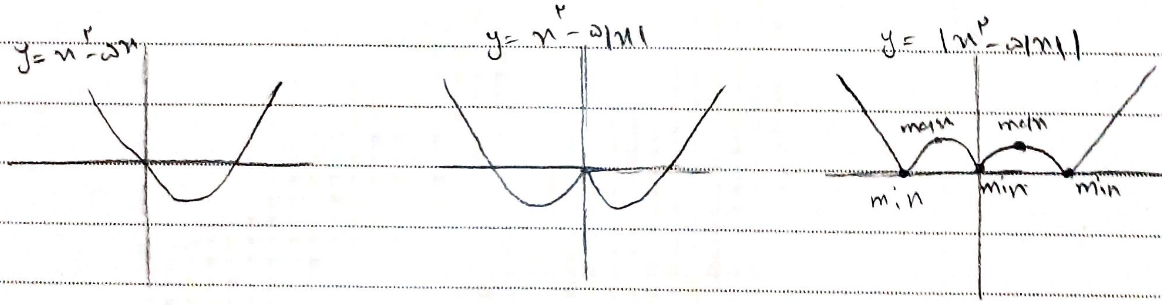

$m = 2$ $\quad n = 3$ $\quad \frac{n}{m} = \frac{3}{2}$

Arman

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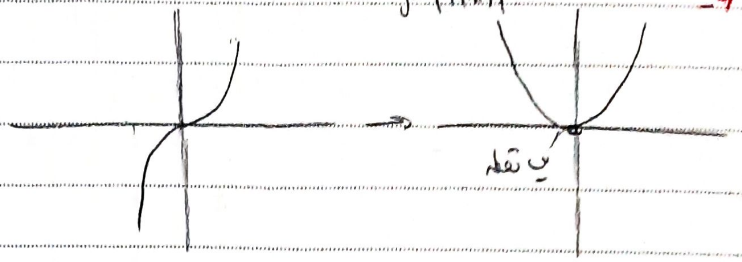
$f(x) = x(|x|+3)$

$x \geq 0 \Rightarrow f(x) = x^2 + 3x$

$x < 0 \Rightarrow f(x) = -x^2 + 3x$



۷-

$0 < x < a \Rightarrow |x-a| = a-x \qquad f(x) = \sqrt[3]{x^2}\,(a-x) = a x^{\frac{2}{3}} - x^{\frac{5}{3}}$

$f'(x) = \frac{2}{3} a x^{-\frac{1}{3}} - \frac{5}{3} x^{\frac{2}{3}} = \frac{2}{3} x^{-\frac{1}{3}} \left(a - \frac{5}{2}x\right) = \frac{2\left(a - \frac{5}{2}x\right)}{3\sqrt[3]{x}}$

$\frac{2\left(a - \frac{5}{2}x\right)}{3\sqrt[3]{x}} = 0$

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$f(x) = \sqrt{x|x| - x} = \sqrt{x(|x|-1)} \rightarrow x(|x|-1) \geq 0$

-1	0	1
$-$	$+$	$-$ $+$

$x \geq 1 \Rightarrow f(x) = \sqrt{x^2 - x} \Rightarrow f'(x) = \frac{2x-1}{2\sqrt{x^2-x}} = 0 \rightarrow x = \frac{1}{2}$ غ ق ق

$-1 \leq x < 0 \Rightarrow f(x) = \sqrt{-x^2 - x} \Rightarrow f'(x) = \frac{-2x-1}{2\sqrt{-x^2-x}} = 0 \rightarrow x = -\frac{1}{2}$

$-\frac{1}{2}$: $+$ ↗ | ↘ $-$

max نسبی

$x = 0, -1, -\frac{1}{2}, 1 \Rightarrow$ بحرانی

$\frac{4m+n}{4-n} = \frac{4 \times 1 + 0}{4 - 0} = 1$

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$y' = \frac{m(x-1+m) - (mx+2)(1)}{(x-1+m)^2} = \frac{m^2 - m - 2}{(x-1+m)^2}$

$\rightarrow m^2 - m - 2 < 0 \Rightarrow (m-2)(m+1) < 0$

-1	2
$+$ $-$	$+$

$\rightarrow m = 0, 1$

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

$x > 0 \Rightarrow \frac{x}{1-x^2} \Rightarrow f'(x) = \frac{1(1-x^2) - (-2x)(x)}{(1-x^2)^2}$ ... ۱

$= \frac{1-x^2+2x^2}{(1-x^2)^2} = \frac{1+x^2}{(1-x^2)^2} \Rightarrow x = \pm 1$ ق ق

$x < 0$

$\frac{x}{1+x^2} \Rightarrow f'(x) = \frac{1(1+x^2) - 2x(x)}{(1+x^2)^2} = \frac{1+x^2-2x^2}{(1+x^2)^2}$

$= \frac{1-x^2}{(1+x^2)^2} = 0 \rightarrow x = \pm 1$ تعریف نمی‌شود

۲ نقطه