

$$f(a) = 1 - \frac{a}{a^2} \Rightarrow [1, 3] \rightarrow \frac{1 - \frac{a}{3} - 1 + a}{2} = \frac{a}{3}$$

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

$x = -\sqrt{3}$ در بازه ی [۳] قرار ندارد
پس $x = \sqrt{3}$ تنها قابل قبول است!

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$$y = 2ax^2 - 2ax + 11a$$

$$\Delta = 0 \Rightarrow 4a^2 - 4(2a)(11a) = 0 \Rightarrow 4a^2 - 88a^2 = 0 \Rightarrow -84a^2 = 0 \Rightarrow a = 0$$

$$2ax^2 - 4ax + 11a = 0 \Rightarrow 2x^2 - 4x + 11 = 0 \Rightarrow x = \frac{4 \pm \sqrt{16 - 88}}{4} = \frac{4 \pm \sqrt{-72}}{4}$$

$$y' = 4ax - 2a = 0 \Rightarrow 4ax = 2a \Rightarrow x = \frac{1}{2}$$

$$2ax^2 - 4ax + 11a = 0 \Rightarrow 2x^2 - 4x + 11 = 0$$

$2x = 4 \Rightarrow x = 2$
 $-2x = 4 \Rightarrow x = -2$

$\text{D} = 0 \Rightarrow x = 2$
 $\text{D} = 0 \Rightarrow x = -2$

$a = -\frac{1}{2}$

$$y = x^3 - 12x + 2$$

$$y' = 3x^2 - 12 = 0 \Rightarrow x^2 = 4 \Rightarrow x = \pm 2$$

$x = 2 \Rightarrow 1 - 24 + 2 = -21 \rightarrow \text{min}$
 $x = -2 \Rightarrow -1 + 24 + 2 = 25 \rightarrow \text{max}$

$$3x^2 - 12 = 0 \Rightarrow x^2 = 4 \Rightarrow x = \pm 2$$

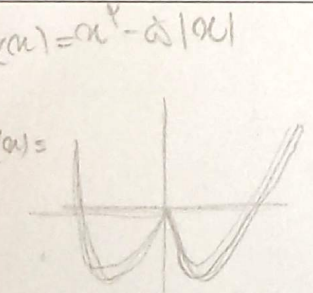
$$y = x^3 + ax^2 - 2bx - 2$$

$$y' = 3x^2 + 2ax - 2b = 0$$

$b = 0, a = 2$

$\Rightarrow 3x^2 + 4x = 0 \Rightarrow x(3x + 4) = 0 \Rightarrow x = 0, x = -\frac{4}{3}$

$\Rightarrow AB = \sqrt{4 + 16} = 2\sqrt{5}$



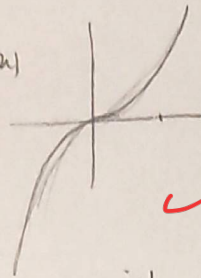
$\text{min} = 0 \Rightarrow x = 0$
 $\text{max} = 1 \Rightarrow x = -1, 1$

$$f(x) = a(|x| + x^2)$$

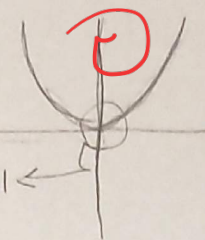
$$\begin{cases} x^2 + 12x \\ -x^2 + 12x \end{cases}$$

$$\Rightarrow y = |f(x)|$$

$f(x)$



$$y = |f(x)|$$



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$$f(x) = x^{\frac{1}{p}} |a-x| \rightarrow (a-x)^{\frac{1}{p}} x^{\frac{1}{p}} \Rightarrow a x^{\frac{1}{p}} - x^{\frac{1}{p} + 1} \rightarrow f'(x) = \frac{1}{p} a x^{\frac{1}{p}-1} - \frac{1}{p} x^{\frac{1}{p}}$$

$$\frac{a-x}{p} (a-x) = 0 \Rightarrow \begin{cases} a=0 \\ x=a \end{cases}$$

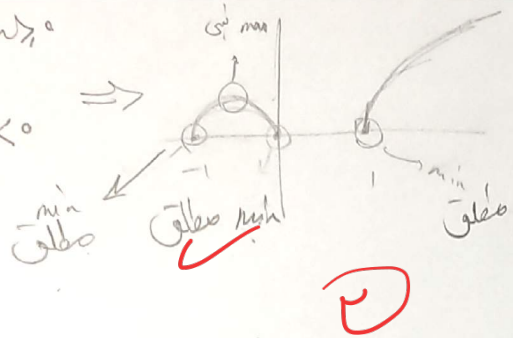
$$\Rightarrow x=1 \rightarrow a=2$$

$$\Rightarrow \left(\frac{a}{p} - a\right) a^{\frac{1}{p}-1} = 0 \Rightarrow \frac{a}{p} a^{\frac{1}{p}-1} = 1 \Rightarrow a^{\frac{1}{p}} = p$$

$$f(x) = \sqrt{a|x| - x} \begin{cases} \sqrt{x^2 - a} & ; x > 0 \\ \sqrt{-x^2 - a} & ; x < 0 \end{cases}$$

$$\Rightarrow \begin{cases} m=1 \\ n=0 \\ k=p \end{cases}$$

$$\frac{p+0}{p-0} = \frac{p}{p} = 1$$



$$y = \frac{mx+p}{x-1+m} \Rightarrow y' = \frac{m(x-1+m) - (mx+p)}{m^2} = \frac{m^2 - m - p}{m^2} > 0$$

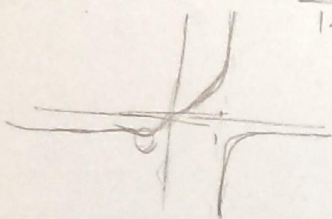
$$\frac{(m-p)(m+1)}{m^2} > 0 \Rightarrow \begin{matrix} - & + & * & - & + \\ | & - & | & - & | \\ + & - & - & + & + \end{matrix} \Rightarrow m \in [-1, p) \Rightarrow \{ -1, 0, 1 \}$$

live

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

$$\frac{x}{1-ax} \Rightarrow \frac{1-ax^2 + 2ax}{(1-ax)^2} \Rightarrow \frac{x^2+1}{(1-ax)^2} = 0 \Rightarrow x^2+1=0 \rightarrow \text{ریشه ندارد}$$

$$\frac{x}{1+ax^2} \Rightarrow \frac{1+ax^2 - 2ax}{(1+ax^2)^2} \Rightarrow \frac{-x^2+1}{(1+a^2)^2} = 0 \Rightarrow 1-ax^2=0 \rightarrow x = \pm 1 \rightarrow a = -1$$



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$$f'(n) < 0 \rightarrow m^2 - m - 2 \leq 0 \rightarrow -1 \leq m \leq 2, m \neq 2 \rightsquigarrow -1 \leq m < 2$$

$$f''(n) > 0 \rightarrow 1 - m \leq 1 \rightarrow m \geq 0$$

$$1, 2 \rightsquigarrow m = 0 \leq 1$$