

$f(1) = 1 - a$
 $f(x) = 1 - \frac{a}{x} \Rightarrow \frac{df}{dx} = \frac{1 - \frac{a}{x} + a - 1}{x - 1} = \frac{a}{x}$
 $f'(u) = \frac{a}{x^2} \Rightarrow \frac{a}{x^2} = \frac{a}{x} \Rightarrow x = \pm \sqrt{x}$
 $\begin{cases} x = -\sqrt{x} \times \\ x = \sqrt{x} \checkmark \end{cases}$

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$y = \frac{a}{x^2} - \omega x + 1/a \rightarrow \frac{a}{x^2} - \omega x + 1/a = 0$
 $\frac{a}{x^2} - \omega x + 1/a = 0$
 $\frac{a}{x^2} - \omega x + 1/a = 0 \rightarrow x = \frac{\omega \pm \sqrt{\omega^2 - 4/a}}{2/a}$
 $\omega x - \omega = \frac{a}{x} \rightarrow x = \frac{a}{\omega}$
 $\frac{a}{x^2} - \omega x + 1/a = 0 \rightarrow 9 - 4/a = 0 \rightarrow a = \frac{1}{9} \rightarrow a = \frac{1}{9}$

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$y' = \frac{a}{x^2} - \omega, \omega(x - \epsilon)$
 $\frac{-x}{+} \quad \frac{x}{-}$
 $\Rightarrow x = \epsilon, y = -\epsilon$

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$y' = \frac{a}{x^2} + \omega x - \epsilon$
 $\frac{a}{x^2} + \omega x - \epsilon = 0 \rightarrow x = \frac{\omega \pm \sqrt{\omega^2 + 4/a}}{2}$
 $\frac{a}{x^2} + \omega x - \epsilon = 0 \rightarrow x = \frac{\omega \pm \sqrt{\omega^2 + 4/a}}{2}$
 $\frac{a}{x^2} + \omega x - \epsilon = 0 \rightarrow x = \frac{\omega \pm \sqrt{\omega^2 + 4/a}}{2}$

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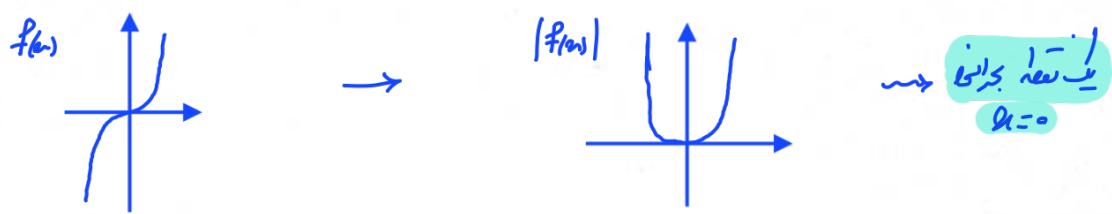
$f(x) = x^2 - \omega|x| = \begin{cases} x^2 - \omega x & x \geq 0 \quad (I) \\ x^2 + \omega x & x < 0 \quad (II) \end{cases}$



$n = \frac{1}{\sqrt{a}}$
 $m = \frac{1}{\sqrt{a}} \rightarrow \frac{n}{m} = \frac{1}{\sqrt{a}}$

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$$f(x) = \begin{cases} x^r + \frac{r}{2}x & x > 0 \\ -x^r + \frac{r}{2}x & x < 0 \end{cases} \rightarrow f'(x) = \begin{cases} rx + \frac{r}{2} & x > 0 \\ -rx + \frac{r}{2} & x < 0 \end{cases} \rightarrow f'(\cdot) = \begin{cases} + \\ - \end{cases} = \frac{r}{2}$$



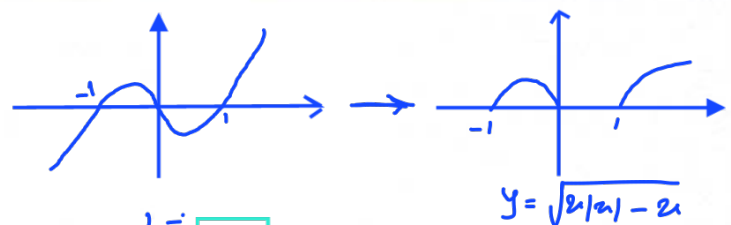
$$x \in [0, a] \rightarrow |x-a| = -(x-a) \rightarrow f(x) = -\sqrt[r]{x^r(x-a)} = -x^{\frac{a}{r}} + ax^{\frac{r-1}{r}}$$

$$f'(x) = -\frac{a}{r}x^{\frac{a}{r}-1} + \frac{r-1}{r}ax^{\frac{r-1}{r}-1} = 0 \rightarrow \frac{1}{r}x^{\frac{1}{r}}(-ax + \frac{r-1}{r}a) = 0 \rightarrow \begin{cases} x=0 \\ x = \frac{r-1}{r}a \rightarrow \max \checkmark \end{cases}$$

$$f(x_{\max}) = \frac{r-1}{r}a \rightarrow f(\frac{r-1}{r}a) = \frac{r-1}{r}a \rightarrow -\sqrt[r]{\frac{r-1}{r}a^r (\frac{r-1}{r}a - a)} = \frac{r-1}{r}a \rightarrow a \times \sqrt[r]{\frac{r-1}{r}a^r} = \frac{a}{r}$$

$$\frac{r-1}{r}a \rightarrow a^r \times \frac{r-1}{r}a^r = \frac{r-1}{r}a^r \rightarrow a^{\frac{r}{r}} = \frac{r-1}{r}a^r \times \frac{r}{r-1} = (\frac{a}{r})^{\frac{r}{r-1}} \rightarrow a = \frac{a}{r} = \frac{a}{r}$$

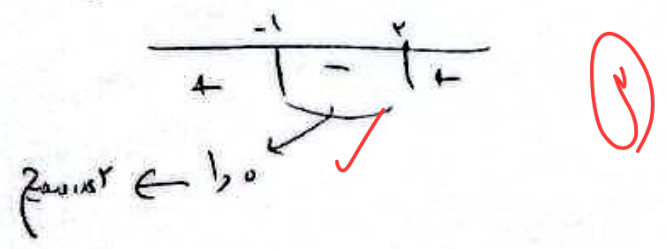
$$y = |x| \sqrt{x-2} \rightarrow \begin{cases} x^2 - 2 & x > 0 \quad (I) \\ -x^2 - 2 & x < 0 \quad (II) \end{cases}$$



(بجای x=2) $K = \frac{r}{2}$ و (max بجای) $M = 1$ و (min بجای) $N = 0$

$$\frac{Km + N}{K - N} = \frac{\frac{r}{2} \cdot 1 - 0}{\frac{r}{2} - 0} = \frac{r}{2} = 1$$

$$y' = \frac{m(x-1+m) - (m+1)x}{(x-1+m)^2} < 0 \rightarrow (m-1)(m+1) < 0$$



$$D_{f(x)} = 1 - x^2 = 0 \rightarrow x^2 = 1 \rightarrow \begin{cases} x > 0 & x^2 = 1 \rightarrow x = 1 \checkmark \\ x < 0 & -x^2 = 1 \rightarrow x^2 = -1 \times \end{cases} \rightarrow D_f = \mathbb{R} - \{1\}$$

$$\begin{cases} x > 0 \rightarrow f'(x) = \frac{1 - x^r + rx^r}{(1-x^r)^2} = \frac{x^r + 1}{(1-x^r)^2} \rightarrow x^r = -1 \times \\ x < 0 \rightarrow f'(x) = \frac{1 + x^r - rx^r}{(1+x^r)^2} = \frac{1 - x^r}{(1+x^r)^2} \rightarrow x^r = 1 \rightarrow x = -1 \checkmark \end{cases}$$

بجای x=1