

$f(x) = \sqrt{x} + \sqrt{a-x}$, $f'(x) = \frac{1}{2\sqrt{x}} - \frac{1}{2\sqrt{a-x}}$
 $x \geq 0 \rightarrow \sqrt{x} + \sqrt{a-x}$, $f'(x) = \frac{1}{2\sqrt{x}} - \frac{1}{2\sqrt{a-x}}$
 $x < 0 \rightarrow \sqrt{x} + \sqrt{a-x}$, $f'(x) = \frac{1}{2\sqrt{x}} - \frac{1}{2\sqrt{a-x}}$

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$0 < x < a$

$x \in (a, \infty)$

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

$\frac{1}{2\sqrt{x}} - \frac{1}{2\sqrt{a-x}} = 0 \rightarrow x = \frac{a}{2}$

$f(x) = \sqrt{\frac{a}{2}} + \sqrt{\frac{a}{2}}$, $f(a) = \sqrt{a}$

$\sqrt{\frac{a}{2}} + \sqrt{\frac{a}{2}} = \sqrt{2a}$

$[a] \in \dots$

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

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

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

$$f(x) = Mx^2 + Nbx + C$$

. 1

$$f(x) = ax^2 + bx + c + d \quad x=0 \rightarrow d=0$$

$$x=1 \rightarrow a+b+c=1$$

$$Mx^2 + Nbx + C \quad x=0 \rightarrow C=0$$

$$x=1 \rightarrow M+N=0$$

$$C=0 \rightarrow a+b=1 \quad a+b=1 \quad x=1 \rightarrow M+N=0$$

$$M+N=0 \rightarrow M=-N$$

$$ab = Mx - N = -1$$

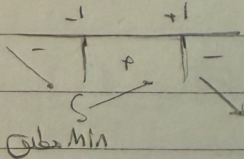
$$-b = -M \rightarrow b = M \rightarrow a = -1$$

$$x \leq \sqrt{2} \text{ or } x \geq \sqrt{2} \rightarrow x^2 \geq 2$$

. 2

$$\sqrt{2} < x < \sqrt{2} \rightarrow x^2 < 2$$

$$Mx - 2^M \rightarrow f(x) = Mx - 2^M = M(1 - 2^{\frac{1}{M}}) < 0$$



$$x=1 \rightarrow M(1-1) = 0$$

$$\underline{(1, \infty)}$$

$$-x^2 + Mx^2 + b = y \rightarrow -x^2 + 4ax$$

. 4

$$M-4a=0 \rightarrow 4a=M \rightarrow a = \frac{M}{4}$$

$$x^2 - \frac{M}{4}x^2 + b \quad x=1 \rightarrow 1 - \frac{M}{4} + b = 1 \rightarrow b = \frac{M}{4}$$

$$\frac{b}{a} = \frac{\frac{M}{4}}{\frac{M}{4}} = 1$$

$$\text{ext. } \left(\frac{-b}{2a}, \frac{-d}{2a} \right) \rightarrow \frac{-b}{2a}, \frac{-1}{2a} \mid \frac{-d}{2a}, \frac{1}{2a}$$

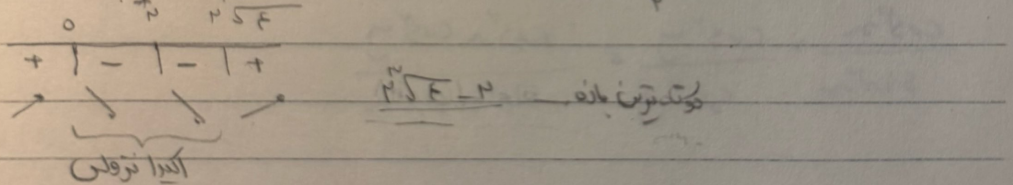
$$\frac{a}{a+1} \cdot \frac{1}{2} = \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$$

$$\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4} \rightarrow \frac{2 - \frac{1}{2}}{2} = \left(\frac{3}{4} \right)$$

$$A: \left(\frac{-1}{2}, \frac{1}{2} \right) \quad f: \left(\frac{-1}{2} \right)^2 + a \left(\frac{-1}{2} \right) + b = \frac{1}{4} - \frac{a}{2} + b$$

$$f(x) = \frac{x^2}{2^{n-1}} \quad f'(x) = \frac{f(x)^2 (2^n - 1) - (2^n)^2}{(2^n - 1)^2}$$

$$\frac{f(x)^2 (2^n - 1) - (2^n)^2}{(2^n - 1)^2} = \frac{2^{2n} - 4 \cdot 2^n + 1 - 2^{2n}}{(2^n - 1)^2} = \frac{1 - 4 \cdot 2^n + 1}{(2^n - 1)^2}$$



$$f(x) = \frac{x^2 - 1}{2^n - 1} \quad f'(x) = \frac{(2x)(2^n - 1) - (2^n)(2x)}{(2^n - 1)^2}$$

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

