

۱) رتبه: مشتق ناپذیر است (تشریفه) $\rightarrow n < 1$
 $f(n) = \begin{cases} |n| + a & n < 1 \\ b \sqrt[n]{n^2} & n \geq 1 \end{cases}$
 $\Leftarrow$ رتبه: مشتق پذیر

پیوسته بودن $\rightarrow 1 + a = b$ $f'_-(1) = +1$

$f'_+(1) = \frac{2b}{n} \times \frac{1}{\sqrt[n]{n^2}} = \frac{2b}{n} = 1 \rightarrow b = 1/2 \quad a = 1/2$
 $a + b = 1$

$f(1) = \frac{1-2n}{\sqrt[n]{n^2}} \Rightarrow f'(1) = \frac{(-2)(1) - (\frac{1}{n})(2)}{1} = \frac{-10}{n}$

$g(1) = \frac{|n-2| + \sqrt[n]{n^2}}{\sqrt[n]{n^2}} = \frac{(2-n) + \sqrt[n]{n^2}}{\sqrt[n]{n^2}}$

$g'(1) = \frac{(-1 + \frac{\sqrt[n]{n^2}}{n}) \times 1 - (1 + \sqrt[n]{n^2})(\frac{1}{n})}{1} = \frac{-5}{n} - \frac{\sqrt[n]{n^2}}{n} = \frac{-10 - \sqrt[n]{n^2}}{n}$

$f'(1) - 2g'(1) = \frac{-10}{n} - 2(\frac{-10 - \sqrt[n]{n^2}}{n}) = \frac{\sqrt[n]{n^2}}{n}$

$ba + c = \frac{1}{a}$

$ba^2 + ca = 1$

(۳)

$f'_-(a) = b$

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

$a^2 b = -1$

$ca - 1 = 1$

$ca = 2$

۴) شرایط لازم بودن: (۱) پیوسته برقرار $b = b + (a-a)^m$

۲) متفاوت بودن مشتق‌ها $f'_-(a) = 0 \Rightarrow f'_+(a) \neq 0$

$f'_+(a) = m \times (n-a)^{m-1} \neq 0 \Rightarrow m = 1 \quad f'_+(a) = 1$

لیک‌م‌دار صبیح m (۱) برای هر مقدار صبیح دیگر m مشتق راست صفری شود

$$g' \times f'(g) = (f \circ g)'(-\sqrt{2}) \quad (3)$$

$$g(x|x < 0) = \frac{1}{2x^2} \Rightarrow f \circ g = \frac{1}{\sqrt{\frac{1}{2x^2} + \frac{1}{2x^2}}} = \frac{1}{\sqrt{2x^2}} = x$$

$$f \circ g(x) = x \Rightarrow (f \circ g)'(-\sqrt{2}) = 1$$

$$f'(x) = -a \quad f(x) = -ax - b \quad (4)$$

$$f'(x) - f(x) = -a + ax + b = 2a + b = 2 \rightarrow a = -1, b$$

$$f'(x) = 1, b \quad f(x) = -0.1b \quad \frac{f(x)}{f'(x)} = \frac{-1}{x}$$

$$f \circ g\left(\frac{x}{\sqrt{x}}\right) = \left(x \times \frac{1}{\sqrt{x}}\right)^2 + 1 = 14x^2 + 1 \quad (5)$$

$$g\left(\frac{x}{\sqrt{x}}\right) = x \Rightarrow (f \circ g)'(x) = g'(x) \times 2x$$

$$(f \circ g)'(x) = \frac{-1}{x \times \sqrt{(x^2-1)^2}} \times 2x \quad x = \frac{\sqrt{2}}{2}, \quad \frac{-14 \times 2 \times \sqrt{2}}{2} = -4\sqrt{2}$$

$$\Rightarrow -4\sqrt{2} = -12\sqrt{2} \quad \text{يك برابر}$$

$$0 = \text{در دو نوبت} \rightarrow f'(x) = f'(x+b) \Rightarrow f'(-1) = f'(1) = 1 \quad (6)$$

$$g'(-2) = f'(-1) + f'(1) = 2$$

$$\lim_{h \rightarrow 0} \frac{f(\delta-h) - 2}{h} \times \frac{f(\delta-h) - 1}{\delta-h} \xrightarrow{f(\delta)=2} f'(\delta) \times \frac{f(\delta-h) - 1}{\delta-h}$$

$$f'(\delta) = 2 + \frac{1}{2 \times \delta} = \frac{2\delta}{1\delta} \times \frac{1}{\delta} = \frac{\delta}{1\delta}$$

$$m = -2 \leftarrow 4y = 2x + 1 \quad (10)$$

$$2x - 4 = -2 \quad x = 1 \quad \text{نقطه (1, 2)}$$