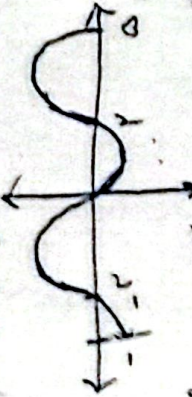




$$y = \sqrt{x f(x)} \quad x \in [0, 4]$$

فرض کنیم $f(x) = x^2 - 4x + 4$ و $x = 0$ و $x = 4$ را در نظر بگیریم. $f(0) = 4$ و $f(4) = 0$ پس $f(x) \geq 0$ در $[0, 4]$ است. $y = \sqrt{x f(x)}$ در $[0, 4]$ تعریف می‌شود.

پس $f(x) = x^2 - 4x + 4 = (x-2)^2$ و $f(x) \geq 0$ در $[0, 4]$ است. $y = \sqrt{x f(x)} = \sqrt{x(x-2)^2} = |x-2|\sqrt{x}$ در $[0, 4]$ تعریف می‌شود.



$$y = \sqrt{\frac{-x}{f(x)}} \quad x \in [0, 4]$$

فرض کنیم $f(x) = x^2 - 4x + 4$ و $x = 0$ و $x = 4$ را در نظر بگیریم. $f(0) = 4$ و $f(4) = 0$ پس $f(x) \geq 0$ در $[0, 4]$ است. $y = \sqrt{\frac{-x}{f(x)}} = \sqrt{\frac{-x}{(x-2)^2}} = \frac{\sqrt{-x}}{|x-2|}$ در $[0, 4]$ تعریف می‌شود.

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$$f(x) = x^2 - 3x + 1 \quad \frac{f(3) - f(-1)}{f'(x)} = ? \quad f'(x) = [f(x)]'$$

$$f(3) = 9 - 9 + 1 = ①$$

$$f(-1) = 1 - 3 + 1 = ②$$

$$f'(x) = 2x - 3 = -1$$

$$\frac{f(3) - f(-1)}{f'(x)} = \frac{1 - 2}{-1} = ⑤$$

$$f(x) = \begin{cases} x^2 + 1 & x > 1 \\ x^2 & x < 1 \end{cases} \quad \frac{f(2) - f(-1)}{f'(x)}$$

$$f(2) = 2^2 + 1 = ⑤$$

$$f(-1) = (-1)^2 = ②$$

$$f'(x) = 2x = ②$$

$$\frac{5 - 2}{2} = \frac{3}{2} = ① \frac{3}{2}$$

$$f = \{(2, 4), (3, 9), (1, 1), (1, 3)\}$$

$$f(x) = x^2$$

$$f(2) = 4$$

$$f(3) = 9$$

$$f(1) = 1$$

$$\frac{4 - 9}{2 - 3} = \frac{-5}{-1} = 5 = ⑤$$

$$f(x) = \frac{x^2 + 2x + 9}{x^2 + 2x + 5}, \quad f(f(\sqrt{3} - 1)) = ?$$

$$x = \sqrt{3} - 1$$

$$f(\sqrt{3} - 1) = \frac{(\sqrt{3} - 1)^2 + 2(\sqrt{3} - 1) + 9}{(\sqrt{3} - 1)^2 + 2(\sqrt{3} - 1) + 5} = \frac{3 - 2\sqrt{3} + 1 + 2\sqrt{3} - 2 + 9}{3 - 2\sqrt{3} + 1 + 2\sqrt{3} - 2 + 5} = \frac{11}{11} = 1$$

$$f(1) = \frac{1^2 + 2(1) + 9}{1^2 + 2(1) + 5} = \frac{12}{8} = \frac{3}{2} = ① \frac{3}{2}$$

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

$$f(\sqrt{x}) = (\sqrt{x})^2 + \frac{1}{(\sqrt{x})^2} = x + \frac{1}{x}$$

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

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

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