

«روزنامه خراسان»

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«تبیان‌هایت الحسینی»

$$f(x) = \sqrt{\log_r(x-1)} \quad g(x) = \sqrt{-x^2 + 4x - 4} \quad D_{g \circ f}(x) = ?$$

$$D_{g \circ f}(x) = \{x \in D_f : f(x) \in D_g\}$$

$$\log_r(x-1) \geq 0 \rightarrow x-1 \geq 1 \rightarrow x \geq 2 \quad D_f = x \geq 2$$

$$x-1 > 0 \rightarrow x > 1$$

$$-x^2 + 4x - 4 \geq 0 \rightarrow x^2 - 4x + 4 \leq 0 \rightarrow (x-2)^2 \leq 0 \quad + \quad 0 \quad +$$

$$D_g : x = 2 \quad (x-2)^2 = 0 \quad (x-2)^2 \geq 0 \quad \text{فقط در } x=2 \text{ صفر می‌شود}$$

$$D_{g \circ f} : \left\{ x \geq 2 ; \sqrt{\log_r(x-1)} = 2 \right\}$$

$$\rightarrow \log_r(x-1) = 4 \rightarrow \log_r(x-1) = \log_r 16 \rightarrow x-1 = 16 \rightarrow x = 17$$

$$\Rightarrow D_{g \circ f} = \{17\}$$

$$f(x) = 2x - 2 \quad g(x) = x^2 - 3x + 1$$

$$f \circ g(x) = g \circ f(x)$$

$$f(g(x)) = 2(x^2 - 3x + 1) - 2 = 2x^2 - 6x + 2 - 2 = 2x^2 - 6x$$

$$g(f(x)) = (2x - 2)^2 - 3(2x - 2) + 1 =$$

$$4x^2 - 8x + 4 - 6x + 6 + 1 = 4x^2 - 14x + 11$$

$$f \circ g(x) = g \circ f(x) \Rightarrow 2x^2 - 6x = 4x^2 - 14x + 11$$

$$2x^2 - 6x + 3 = 0$$

$$\beta, \alpha : \text{مقادیر}$$

$$\alpha^2 + \beta^2 = 8^2 - 2p \quad x^2 - (14x + \frac{11}{2}) = 0$$

$$x^2 - 8x + p = 0$$

$$\alpha^2 + \beta^2 = 100 - 2\left(\frac{11}{2}\right) = 100 - 11 = 89$$

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$$g \circ f(x) = \omega x^r + 11 \quad f(x) = rx \quad \min g(x-v) = ? \quad -r$$

$$g(f(x)) = \omega x^r + 11 \quad f(x) = rx = t$$

$$x = \frac{t}{r}$$

$$g(t) = \omega \left(\frac{t}{r}\right)^r + 11$$

$$g(t) = \frac{\omega}{r^r} t^r + 11 \Rightarrow g(x) = \frac{\omega}{r^r} x^r + 11$$

$$g(x-v) = \frac{\omega}{r^r} (x-v)^r + 11 = \frac{\omega}{r^r} (x^r - r x^{r-1} v + r x^{r-2} v^2 + \dots) + 11$$

$$x^r - r x^{r-1} v + r x^{r-2} v^2 \rightarrow \text{ext} \quad \left| \begin{array}{l} \frac{-b}{r a} = \frac{r x^{r-1} v}{r} = v \quad \min = 0 \\ r x^{r-1} v - r x^{r-2} v^2 = 0 \end{array} \right.$$

$$\Rightarrow \min g(x-v) = 11$$

$$f(x) = rx - r$$

$$\Rightarrow g \circ f(x) = ?$$

$$f \circ g(x) = rx^r - rx - 1$$

$$f(g(x)) = rx^r - rx - 1 \quad \Rightarrow \quad rg - r = rx^r - rx - 1$$

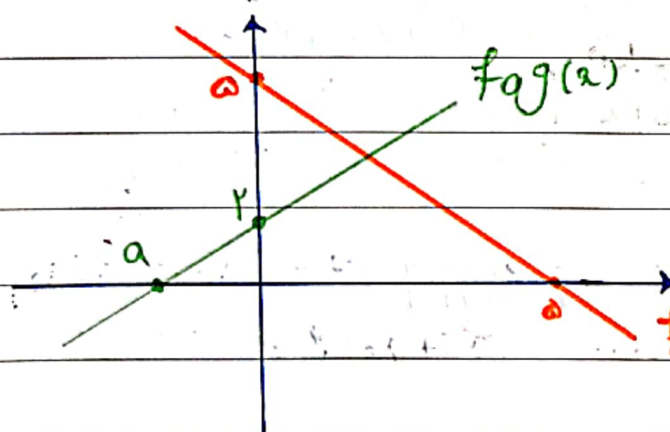
$$f(g(x)) = rg - r$$

$$rg(x) = rx^r - rx + r$$

$$g(x) = x^r - rx + 1 = (x-1)^r$$

$$g \circ f(x) = g(f(x)) = (rx - r - 1)^r = (rx - \omega)^r \Rightarrow$$

$$g \circ f(x) = rx^r - r \cdot x + r \omega$$



$$rg(x) = rf(x) - 1r$$

معادلات خطی در دو متغیر

$$f(x) = ax + b$$

$$g(x) = cx + d$$

خطوط f و g

$$f - g(x) = x + a$$

$$f(x) - g(x) = ax + b - cx - d = (a-c)x + b-d = -x + a \quad (*)$$

$$rg(x) = rf(x) - 1r \quad (*)$$

$$\Rightarrow a - c = -1$$

$$rcx + rd = rax + rb - 1r$$

$$\Rightarrow a - \frac{r}{r}a = \frac{1}{r}a = \frac{1}{r} \Rightarrow a = r$$

$$rc = ra$$

$$rd = rb - 1r$$

$$c = \frac{r}{r}a$$

$$c = r$$

خطوط f و g

$$\begin{cases} b - d = a \times (-1) \\ 1^3b - 1^3d = 1^3 \end{cases} \Rightarrow \begin{cases} -1b + 1d = -1 \\ 1^3b - 1^3d = 1^3 \end{cases}$$

$$\underline{b = 1, d = -1}$$

$$\Rightarrow f(x) = ax + b = 1x + 1 \Rightarrow f(g(x)) = 1(1^3x - 1) + 1 = 1^3x - 1 + 1 = 1^3x$$

$$\Rightarrow g(x) = cx + d = 1^3x - 1$$

$$f \circ g(x) = 1^3x + 1 \xrightarrow{\text{بجای } x \text{ از } 0} 1^3x + 1 = 0 \rightarrow x = -\frac{1}{1^3} \Rightarrow x = -\frac{1}{1^3}$$

$$f(x) = a^x \quad g(x) = \log_a x \quad f \circ g(x) \leq g \circ f(x) \quad -4$$

$$f \circ g(x) = f(g(x)) = a^{\log_a x} = x^1 = x$$

$$g \circ f(x) = g(f(x)) = \log_a a^x = x \log_a a = x$$

$$x^2 - 1x \leq 0 \Rightarrow x(x-1) \leq 0 \Rightarrow x \in [0, 1]$$

تعداد اعداد صحیح: ۲

$$f(x) = \log_2 x \quad g(x) = 1x - x^2$$

$$A \rightarrow D_{f \circ g} \quad B \rightarrow R_{f \circ g} \Rightarrow A \cap B = ?$$

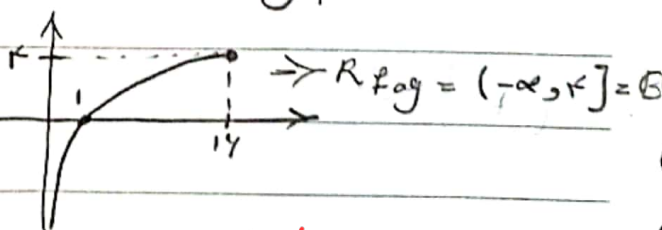
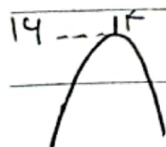
$$D_{f \circ g} = \{x \in D_g; g(x) \in D_f\}$$

$$D_f: x > 0 \Rightarrow x \in \mathbb{R}; -x^2 + 1x > 0 \Rightarrow x^2 - 1x < 0 \Rightarrow x(x-1) < 0 \Rightarrow x \in (0, 1)$$

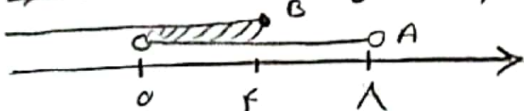
$$D_g: \mathbb{R}$$

خروجی گ در دایره تابع f می شود خروجی f بر روی تابع g می شود:

$$-x^2 + 1x \rightarrow R_g = D_f = x \leq 14 \quad f(x) = \log_2 x$$



$$\Rightarrow A \cap B = (0, 1] \quad x \in \mathbb{Z} \rightarrow 1, 2, 3, 4$$



تعداد اعداد صحیح: ۴

$$f\left(\frac{2r-r}{2}\right) = \textcircled{2r} + 2 \textcircled{-r} - \frac{r}{2} + \textcircled{\frac{r}{2r}} \rightarrow f(2) \quad -v$$

$$f\left(\frac{2r-r}{2}\right) = \left(\frac{2r-r}{2}\right)^r + \frac{2r-r}{2}$$

$$f(2) = 2^r + 2$$

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$$f \circ f(x) = 1 - x f'(x)$$

$$h(g(x)) = f(x)$$

$$g(x) = x - 1$$

$$h(x) = x^2 + 2x + 1$$

$$f(f(x)) = 1 - x f'(x) \rightarrow f(t) = 1 - x t' \rightarrow f(x) = 1 - x x'$$

$$f(x) = t$$

$$h(g(x)) = (x-1)^2 + 2(x-1) + 1 = x^2 - 2x + 1 + 2x - 2 + 1 = x^2 - x + 1$$

$$h(g(x)) = x^2 - x + 1$$

$$\Rightarrow h(g(x)) = f(x) \rightarrow x^2 - x + 1 = 1 - x x'$$

$$x^2 + x - 2 = 1 \rightarrow x^2 + x - 3 = 0 \quad \checkmark$$

$$x x' + x = 0 \quad \Delta y' = 0 - f'(x)(x) = -2 \rightarrow \Delta y' < 0$$

چون دلتا سست عبارت منفی است پس مقادیر اعظم و کمین را می یابیم

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

$$g \circ f(x) = ax^2 + 2x$$

$$g(x) = 1$$

$$\Rightarrow a = ?$$

$$g(f(x)) = ax^2 + 2x$$

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

$$x^2 - 3x = 0 \quad (x-3)(x+1) = 0$$

$$x = 3 \quad x = -1$$

$$g(f(-1)) = -a - 2 = 1 \rightarrow -a = 3 \rightarrow a = -3 \quad \checkmark$$

$$g(f(3)) = 9a + 6 = 1 \rightarrow 9a = -5 \rightarrow a = -\frac{5}{9} \quad \checkmark$$