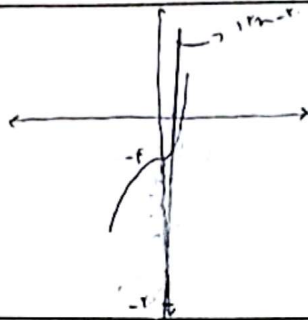


$$h(x) = \begin{cases} x^2 - 4, & x > a \\ 11x - 4, & x \leq a \end{cases}$$

$$a^2 - 4 > 11a - 4$$

$$(a-2)^2 (a+2) > 0$$

$$a+2 > 0 \Rightarrow -a > -2$$



۵)

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$$h^{-1}(r) = x \sim h(x) = r \sim h(x) = \frac{3x}{11} + \frac{k}{-10} = r$$

$$\text{مثال ۱) } h(v) = 3 \times v - 1 = 11$$

$$\Rightarrow h(h(x)) = h(3x - 1) = 3(3x - 1) - 1 = 9x - 4$$

۵)

۲

$$h(x) \xrightarrow{\text{مثال}} h\left(\frac{ax}{x-1}\right) = x \xrightarrow{A(x, a)} \frac{ax}{x-1} = xa \sim a^r = xa^r - xa$$

$$\Rightarrow a^r - xa = 0 \sim a(a-x) = 0 \Rightarrow a = x \quad \checkmark$$

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$$h^{-1} \sim (0, 0) (1, 1) (2, 2) (3, 3) \quad g^{-1} \sim (1, 2) (3, 4) (5, 6)$$

$$\text{مثال ۱) } h \circ h^{-1} = \{(0, 0) (1, 1) (2, 2) (3, 3)\}$$

$$\text{مثال ۲) } h^{-1} \circ h = \{(1, 1) (2, 2) (3, 3) (4, 4)\}$$

$$\text{مثال ۳) } h \circ g^{-1} = \{(1, 2) (3, 4)\}$$

$$\text{مثال ۴) } g^{-1} \circ h = \{(1, 2) (3, 4) (5, 6)\}$$

۵)

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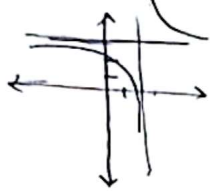
$$g^{-1} \sim (1, 2) (3, 4) (5, 6)$$

$$\frac{h}{h \circ g^{-1}} \xrightarrow{(1, 2) (3, 4) (5, 6)} (1, \frac{1}{2}) (3, \frac{1}{4}) \sim \frac{h}{h \circ g^{-1}} = \frac{1}{r}$$

۵)

۵

$$y = \frac{r\lambda + 1}{\lambda - r}$$

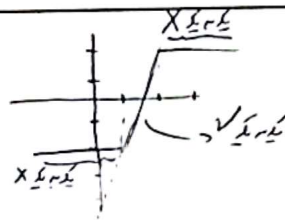


$$\sqrt{\lambda - r} \xrightarrow{\lambda} \lambda = \frac{ry + 1}{y - r} \rightarrow \lambda y - r\lambda = ry + 1 \rightarrow y(\lambda - r) = ry + 1$$

$$\rightarrow y = \frac{ry + 1}{\lambda - r}$$

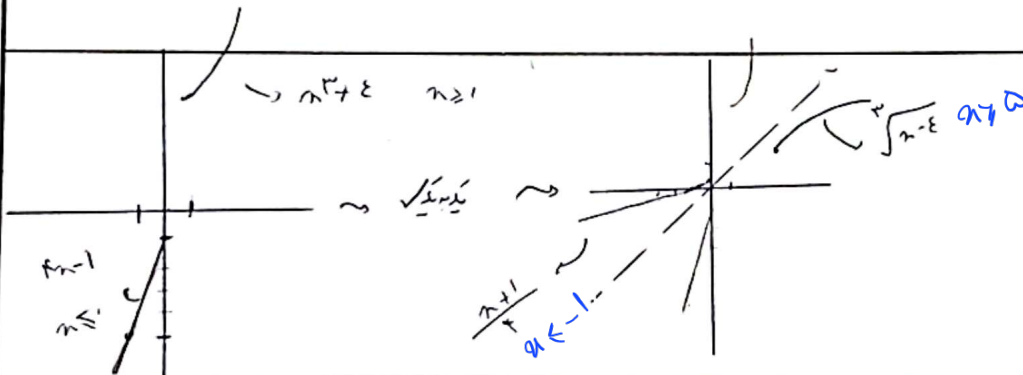
6

$$Q(\lambda) = \left| \lambda - 1 \right| - \left| \lambda - r \right| \rightarrow \frac{1}{\lambda - 1} - \frac{1}{\lambda - r}$$



$$[a, b] \rightarrow r\lambda - \varepsilon = y \sim ry - \varepsilon = \lambda \rightarrow y = \frac{\lambda + \varepsilon}{r}$$

7



8

$$\lambda^r - \frac{\lambda^r + 1 + r\lambda^r + r^2}{\lambda + r} = \frac{\lambda^r + r\lambda^r - \lambda^r - 1 - r\lambda^r - r^2}{\lambda + r} = \frac{-1 - r\lambda}{\lambda + r} = y$$

$$\rightarrow \frac{r(-\lambda - 1)}{r(\lambda + r)} = \frac{1(a\lambda + b)}{-(r\lambda + d)} \rightarrow \frac{-r - r\lambda}{r + r\lambda} = \frac{ra\lambda + rb}{-r\lambda - d} \rightarrow b = -r$$

$$a = -4, d = 4$$

$$h(\lambda)^{-1} = \frac{-4(\lambda + 1)}{r(\lambda + r) + 4} \xrightarrow{\lambda \rightarrow \infty} \frac{-4}{r} = -\frac{4}{r}$$

9

$$h(\lambda) = \frac{\lambda}{\lambda^r + 1} \rightarrow y(\lambda^r + 1) = \lambda \rightarrow y\lambda^r - \lambda + y = 0 \rightarrow \Delta = 1 - 4y^2$$

$$\lambda = \frac{1 \pm \sqrt{1 - 4y^2}}{2y} \sim 1 - \varepsilon y^r \rightarrow r y^r - 1 \leq 0 \rightarrow r y^r \leq 1 \rightarrow \frac{1}{r} \leq y \leq \frac{1}{r}$$

10

$$h(\lambda)^{-1} = \frac{1 \pm \sqrt{1 - 4y^2}}{2y} \rightarrow h(\lambda)^{-1} = \frac{1 + \sqrt{1 - 4y^2}}{2y}, \lambda \in \left[\frac{1}{r}, \frac{1}{r} \right], \lambda \neq \frac{1}{r}$$