(۹)

$y = \frac{5x-14}{1-x} \xrightarrow{\text{قرینه نسبت به } x} \frac{-5x-14}{1+x} \xrightarrow{\text{قرینه } y} \frac{5x+14}{x+1}$

$\xrightarrow{-1,\,5,\,2} \frac{5x+3}{x-1} \xrightarrow[\text{پایین}]{2,\,5} \frac{2x+6}{x-1} = f(x) \rightarrow$

$-3x+3$

$f^{-1}(x) = \frac{x+6}{x-2} = \frac{2x+6}{x-1}$ $\quad x^2-5x-6 = 2x^2+2x-12$

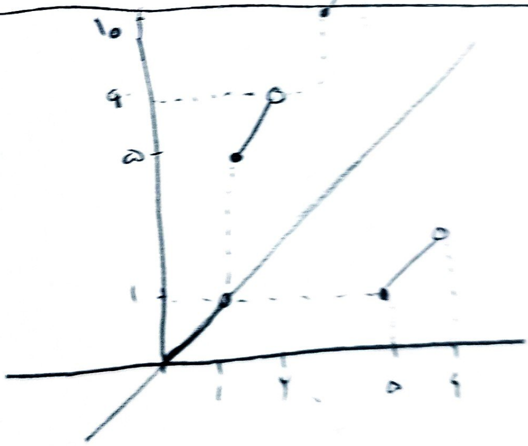
$\Rightarrow x^2+7x-6=0 \quad S = \frac{-b}{2a}$

$\frac{-7}{2} = -3.5$

---

(۱۰)

$f(x) = x + \varepsilon[x]$



if $\varepsilon \rightarrow (5x - \frac{1}{5}x)$

if $\not\varepsilon \rightarrow$

محمدرضا سلمان

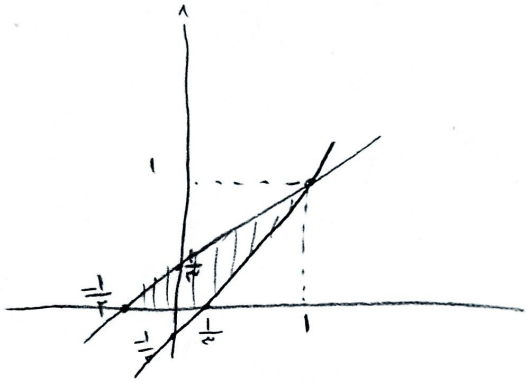
سوال ①

$y = \frac{3x-1}{2}$ وارون $\frac{2x+1}{3}$

$\frac{3x-1}{2} = \frac{2x+1}{3}$ $\quad 9x-3 = 4x+2$

$5x = 5 \quad \longrightarrow x=1 \longrightarrow y=1$

$\frac{2x+1}{5} = 0 \longrightarrow x = \frac{-1}{2}, y=0$ $\quad \frac{3x-1}{2} = 0 \quad x = \frac{1}{3}, y=0$



مساحه $= \frac{1}{3} + \frac{1}{12} = \frac{5}{12}$

ارتفاع $\longrightarrow 1$

$\frac{\frac{5}{12} \times 1}{2} = \frac{5}{24}$

سوال ②

الف) $y = x^2 - 2x + 3 \quad x \in [1, +\infty)$ ✓ $\quad \frac{-b}{2a} = \frac{2}{2} = 1$

چون $x=1$ نباید در بازه باشد یا انتهای یک بازه باید باشد

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

$(x-1)^2 + 2 = y \longrightarrow (x-1)^2 = y-2 \Rightarrow x = 1 + \sqrt{y-2}$

$x \geq 2$

محمدرضا سفیان

③ محمدرضا سلطان:

$f(x) = 2x - \sqrt{16 - 4x(4-x)}$

$2x - \sqrt{4(4-x)(4-x)}$ $\quad 2x - 2|4-x|$

$x<4$: $2x - 8 + 2x$

$x>4$: $2x + 8 - 2x = 8$ ثابت

$\frac{4x-8}{1} \rightarrow \frac{x+8}{4}$

$x=0 \rightarrow y = 2$ $\quad \frac{x+8}{4} = 0 \rightarrow x = -8$

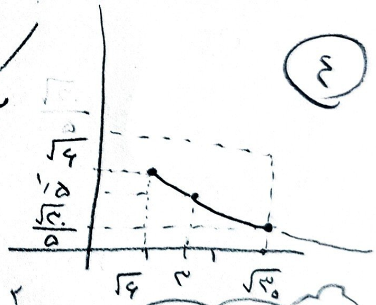
$\frac{8 \times 2}{2} = 8$

---

④

$y = \frac{x}{\sqrt{x^2-5}}$

$\begin{cases} x > \sqrt{5} \\ x < -\sqrt{5} \end{cases}$



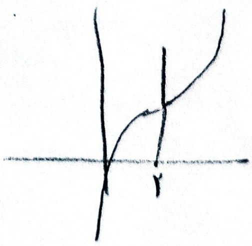
$y^2 = \frac{x^2}{x^2-5}$

$y^2x^2 - 5y^2 = x^2 \rightarrow (y^2-1)x^2 - 5y^2 = 0 \rightarrow x^2 = \frac{5y^2}{y^2-1} \rightarrow x = \sqrt{\frac{5y^2}{y^2-1}}$

---

⑤

$g(x) = \begin{cases} x^2 - 4x + k & x \geq 2 \\ -x^2 + 6x + 3k & x < 2 \end{cases}$



$-4 + 12 + 3k < 4 - 8 + k$

$2k < -12 \longrightarrow k < -6$

(۶)

$f(x) = ۳x + |x|$ $\xrightarrow{x>۰} \dfrac{۴x}{۱} \longrightarrow \dfrac{۱}{۴}x$

$\dfrac{۳}{۸}x + \dfrac{۱}{۸}|x|$ $\xrightarrow{x<۰} ۲x \longrightarrow \dfrac{۱}{۲}x$

$\Rightarrow \dfrac{۳}{۸} \times \dfrac{۱}{۸} = \dfrac{۳}{۶۴}$

---

(۷)

$f(x) = \dfrac{۳x+۴}{x+m} \xrightarrow{۲} \dfrac{۱۰}{۲+m} = -۱۰ \longrightarrow m = -۳ \Rightarrow \dfrac{۳x+۴}{x-۳}$

$f^{-1}(x) = \dfrac{۳x+۴}{x-۳}$

$f(x) = f^{-1}(x)$ پس

$x + \dfrac{۳x+۴}{x-۳} = x \Rightarrow \dfrac{۳x+۴}{x-۳} = ۰ \Rightarrow x = -\dfrac{۴}{۳}$

$f \circ f^{-1}(x) = x$

---

(۸)

$f(۳-۲x) = ۲ - g\left(\dfrac{x}{۲}\right) \longrightarrow f(۳-۲x) - ۲ = -g\left(\dfrac{x}{۲}\right)$

$۳ - ۲x = t$

$-۲x = t + ۳$

$x = \dfrac{t+۳}{-۲} \longrightarrow \dfrac{x}{۲} = \dfrac{t+۳}{-۴}$

$f(t) - ۲ = -g\left(\dfrac{t+۳}{-۴}\right)$