Subject: ---------- Date: ----------

تکلیف ۱ ۱۸/۷۵ مهراد ساعی

$2y = 3x - 1 \Rightarrow f^{-1} = 2x = 3y - 1 \Rightarrow y = \frac{2x+1}{3}$

(۱ $\Rightarrow x = 0 \Rightarrow y = \frac{1}{3}$; $y = 0 \Rightarrow x = -\frac{1}{2}$ $\Big\}$ $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6} \div 2 = \frac{1}{12}$ ۲

$D_{f^{-1}} = R_f = [2, +\infty)$

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

یک به یک است ۱/۵

ب) $y = x^2 - 2x + 3 \Rightarrow x \in [2, +\infty) \Rightarrow$ یک به یک است

$D_{f^{-1}} = R_f = [3, +\infty)$

$f^{-1}(x)$: $x = y^2 - 2y + 3 \Rightarrow x - 3 + 1 = y^2 - 2y + 1 \Rightarrow x - 2 = (y-1)^2$

$\Rightarrow y = \sqrt{x-2} + 1$

(۳ $y = 2x - \sqrt{4x^2 - 16x + 16} = 2x - 2|x-2|$

$\to x \geq 2 \to y = 4$ ۵ ۲

$\to x < 2 \to 4x - 4$ ✓

$\Rightarrow f^{-1}(x) = x = 4y - 4 \Rightarrow y = \frac{x+4}{4}$ $x \in (-\infty, 4]$

$\Rightarrow x = 4 \Rightarrow y = 2$

$\frac{x+4}{4} = 0 \Rightarrow x = -4$

$\Big\{ = \frac{3 \times 4}{2} = 6$

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۴) ① $x_1 = x_2$

$\frac{x_1}{\sqrt{x_1^2-9}} = \frac{x_2}{\sqrt{x_2^2-9}} \to$ ② $x_1^2 = x_2^2 \Rightarrow x_1 = \pm x_2$

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$\Rightarrow f^{-1}(x) : x = \frac{y}{\sqrt{y^2-9}} \Rightarrow x^2 = \frac{y^2}{y^2-9} \Rightarrow y^2 = \frac{9x^2}{x^2-1}$

$\Rightarrow y = \sqrt{\frac{9x^2}{x^2-1}}$

۵) $x > 2 \Rightarrow -[4, 4)$; $-[4,4) \cup (3,8] \Rightarrow 2, 12$

$x = 2 \Rightarrow (3, 8]$; $\Rightarrow 4-4$

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۶) $f^{-1}(x) \begin{cases} x \geq 0 \to \frac{x}{4} \\ x < 0 \to \frac{x}{2} \end{cases} \Rightarrow \begin{matrix} a+b = \frac{1}{4} \\ a-b = \frac{1}{2} \end{matrix}$

$\Rightarrow a = \frac{3}{8} \quad b = -\frac{1}{8} \Rightarrow ab = -\frac{3}{64}$

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۷) $m = 3 \Rightarrow y = \frac{3x+4}{x-3} \Rightarrow f^{-1}(x) = \frac{3x+4}{x-3}$

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$\Rightarrow x + \frac{3x+4}{x-3} = x \Rightarrow \frac{3x+4}{x-3} = 0 \Rightarrow 3x+4 = 0 \Rightarrow x = -\frac{4}{3}$

۸) $3-2x = t \Rightarrow \frac{t-3}{-2} = x$; $f^{-1}(4) = \frac{3-x}{2} \Rightarrow -\frac{1}{2}$

$\frac{x}{2} = t \Rightarrow x = 2t$; $g^{-1}(-2) = 2x \Rightarrow 2 \times -2 = -4$

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$f^{-1}(t) = 3-2x \to x = \frac{3-f^{-1}(t)}{2}$

$g^{-1}(2-t) = \frac{x}{2} \to x = 2g^{-1}(2-t)$; $-4 - \frac{1}{2} = -4.5$

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$t = -2 \to \frac{3-f^{-1}(-2)}{2} = 2g^{-1}(4) \to 4g^{-1}(4) + f^{-1}(-2) = 3$

$$y=\frac{+5x+13}{x+1} \xrightarrow{\text{انتقال}} \frac{2x+6}{x-1} \Rightarrow f(x)=\frac{2x+6}{x-1} \qquad (9$$

$$\Rightarrow f^{-1}(x)=\frac{x+6}{x-2} \Rightarrow \frac{x+6}{x-2}=\frac{2x+6}{x-1} \Longrightarrow \qquad 2$$

$$x^2+5x-6=2x^2+2x-12 \to -x^2+3x+6 \Rightarrow -\frac{b}{a}=3$$

$$f^{-1}(x)=g(x) \to f(x)=x+2[x] \qquad (10$$

$$\Rightarrow f^{-1}(x) \Rightarrow y=x-2[y] \Rightarrow y=x-\frac{2}{3}[x] \qquad 2$$

$$\Rightarrow f-g=x+2[x]-x+\frac{2}{3}[x]=\frac{8}{3}[x]$$