

کلیف 10

بزرگم

$$الف) f = \{ (3, 2), (n, 0), (2, n), (m, 2), (-1, 2) \}$$

$$ب) f = \{ (-1, 1), (1, 2), (2, 3), (a, m-1), (a+2, n), (m, 2) \}$$

$$n^2 - n = 2 \Rightarrow n^2 - n - 2 = 0 \Rightarrow (n-2)(n+1) = 0 \Rightarrow n = 2 \text{ or } n = -1$$

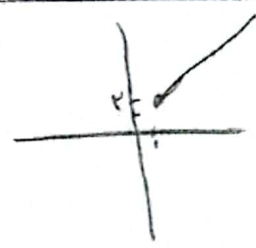
$$m - 1 - 1 = 1 \Rightarrow m = 3$$

$$a = -1 \quad (a = 2)$$

(-1)

$$f(u) = \begin{cases} u-1; & u \geq 1 \\ u+a; & u < 1 \end{cases} \rightarrow D_f = [1, \infty) \cup (-\infty, 1)$$

$$1+a = 1 \Rightarrow a = 0 \quad (a \leq 1)$$



$$f(x) = \begin{cases} x-1; & x \geq 1 \\ a+x-1; & x < 1 \end{cases} \rightarrow D_f = [1, \infty) \cup (-\infty, 1)$$

$$a-1 < 0 \Rightarrow a < 1$$

$$(0, 2)$$

$$الف) y = x^2 + 2 \Rightarrow x^2 + 2 = x^2 + 2 \Rightarrow x^2 = x^2 \Rightarrow x = x \Rightarrow \text{all } x$$

$$ب) x^2 = y - 2 \Rightarrow x = \sqrt{y-2} \Rightarrow y = x^2 + 2$$

$$ج) y = x^2 - 2 \Rightarrow x^2 - 2 = -\frac{1}{x^2} \Rightarrow x^4 - 2x^2 = -1 \Rightarrow x^4 - 2x^2 + 1 = 0 \Rightarrow (x^2 - 1)^2 = 0 \Rightarrow x^2 = 1 \Rightarrow x = \pm 1$$

all x



$$الف) y = \frac{x+1}{x-2} \Rightarrow \frac{x_1+1}{x_1-2} = \frac{x_2+1}{x_2-2} \Rightarrow x_1(x_2-2) - (x_2+1) = x_2(x_1-2) - (x_1+1)$$

$$\Rightarrow x_1 x_2 - 2x_1 - x_2 - 1 = x_1 x_2 - 2x_2 - x_1 - 1 \Rightarrow -2x_1 - x_2 = -2x_2 - x_1 \Rightarrow -x_1 + x_2 = 0 \Rightarrow x_1 = x_2$$

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

$$ب) y = \frac{x+1}{x-2} \Rightarrow \frac{x_1+1}{x_1-2} = \frac{x_2+1}{x_2-2} \Rightarrow x_1(x_2-2) - (x_2+1) = x_2(x_1-2) - (x_1+1)$$

الف) $y = \sqrt{u-1} \rightarrow \sqrt{u-1} = \sqrt{u^2-1} \xrightarrow{\text{توان}} u-1 = u^2-1 \rightarrow u_1 = u_2$
 $y^2 = u-1 \rightarrow u = y^2+1 \rightarrow y = \sqrt{u^2+1}$

ب) $y = u^2 - 9u + 1$, $u \in [19 + \infty)$, $1, 2 \rightarrow -\frac{b}{2a} = \frac{-(-9)}{2} = \frac{9}{2} \rightarrow -1$

 $y = u^2 - 9u + 1 \rightarrow y = (u - \frac{9}{2})^2 - 1$
 $u - \frac{9}{2} = \pm \sqrt{y+1} \rightarrow u = \frac{9}{2} \pm \sqrt{y+1}$

$f(u) = u + \sqrt{u}$ در $(0, +\infty) \rightarrow f^{-1}(u) = a + b - \sqrt{u-c}$ $1 + \frac{1}{\sqrt{u}} = \frac{1}{\sqrt{u}} + \frac{1}{\sqrt{u}}$
 $a + 2b + c = ?$
 $u = y + \sqrt{y} \rightarrow \frac{1}{\sqrt{y}} + u = y + \sqrt{y} + \frac{1}{\sqrt{y}}$
 $\rightarrow u + \frac{1}{\sqrt{y}} = (\sqrt{y} + \frac{1}{\sqrt{y}})^2 \rightarrow \sqrt{y} + \frac{1}{\sqrt{y}} = \sqrt{u + \frac{1}{\sqrt{y}}} \rightarrow \sqrt{y} = \sqrt{u + \frac{1}{\sqrt{y}}} - \frac{1}{\sqrt{y}}$
 $y = u + \frac{1}{\sqrt{y}} - \sqrt{u + \frac{1}{\sqrt{y}}} \quad a + 2b + c = ?$
 $au + b - \sqrt{u-c} \rightarrow a=1, b=\frac{1}{2}, c=-\frac{1}{4}$

$y = \frac{u}{\sqrt{u^2-1}} \rightarrow \frac{u}{\sqrt{u^2-1}} = \frac{u^2}{\sqrt{u^2-1}} \rightarrow \frac{u^2}{u^2-1} = \frac{u^2}{u^2-1}$
 $u_1^2 u_2^2 - u_1^2 = u_1^2 u_2^2 - u_1^2 \rightarrow u_1^2 = u_1^2 \rightarrow u_1 = \pm u_2$
 $y^2 = \frac{u^2}{u^2-1} \rightarrow y^2 u^2 - u^2 = u^2 \rightarrow u^2 (y^2 - 1) = u^2$
 $u^2 = \frac{u^2}{y^2-1} \rightarrow u = \pm \sqrt{\frac{u^2}{y^2-1}} \rightarrow y = \pm \sqrt{\frac{u^2}{u^2-1}}$

$f^{-1}(u) = \frac{u}{1+|u|}$, $g(u) = \sqrt{u} - 1$, $f(-\frac{1}{\sqrt{v}}) + g^{-1}(-\frac{1}{\sqrt{v}}) = ?$

$y + g(u) = u \rightarrow u(y-1) = -y \rightarrow u = -\frac{y}{y-1} \rightarrow y = -\frac{u}{u-1}$
 $\frac{-\frac{1}{\sqrt{v}}}{-\frac{1}{\sqrt{v}} - 1} = \frac{\frac{1}{\sqrt{v}}}{-\frac{1}{\sqrt{v}}} = \frac{-\frac{1}{\sqrt{v}}}{\frac{1}{\sqrt{v}}}$
 $\sqrt{u} = y + 1 \rightarrow u = (y+1)^2 \rightarrow y = (\sqrt{u}+1)^2$
 $\frac{-\frac{1}{\sqrt{v}}}{(\frac{-\frac{1}{\sqrt{v}}}{\sqrt{v}}+1)^2} = \frac{\frac{1}{\sqrt{v}}}{(\frac{1}{\sqrt{v}})^2} = \frac{1}{\sqrt{v}}$
 $\frac{-\frac{1}{\sqrt{v}}}{\sqrt{v}} + \frac{1}{\sqrt{v}} = \frac{-\frac{1}{v} + \frac{1}{v}}{\sqrt{v}} = \frac{0}{\sqrt{v}} = 0$

$f^{-1}(u) = \sqrt{u-1}$, $g(u) = f(u) + \sqrt{f(u)}$, $g^{-1}(12) = ?$

$y = \sqrt{u-1} \rightarrow y^2 = u-1 \rightarrow u = y^2+1 \rightarrow y = \sqrt{u^2+1} \rightarrow g(u) = u^2+1 + \sqrt{u^2+1}$
 $u^2+1 + \sqrt{u^2+1} = 12 \rightarrow \sqrt{u^2+1} = 11$
 $u^2+1 = 121 \rightarrow u^2 = 120 \rightarrow u = \sqrt{120}$