

$$n^3 - 4; n > a$$

$$12n - 20; n \leq a$$

$$\begin{aligned} \text{مقرر} \rightarrow n^3 - 4 \leq 12n - 20 \quad n > n^3 - 12n + 14 \\ (n-2)(n-2)(n+4) \\ \begin{array}{c} -2 \quad -2 \quad +4 \\ - \quad - \quad + \quad + \end{array} \end{aligned}$$

$$a = [-4, +\infty)$$

$$f(n) = 3n + 1$$

$$f(n) = 3n - 1$$

$$f(4) = 3 \times 4 + 1 = 13 \quad n > 4 = -1$$

$$f(7) = 3 \times 7 - 1 = 20 \quad \boxed{11} \quad \checkmark$$

$$f(f(n)) = 3(3n - 1) - 1 = \boxed{9n - 4} \quad \checkmark$$

$$f(n) = \frac{an}{n-1}$$

$$(a, 2a)$$

$$\begin{aligned} y = 2a \quad \left. \begin{array}{l} y = 2a \\ n = a \end{array} \right\} \quad 2a = \frac{a \times a}{a-1} \quad n > a^2 - 2a = 0 \\ a(a-2) = 0 \\ a = 0 \rightarrow \text{انکار پذیر نیست} \quad n > \boxed{a = 2} \end{aligned}$$

$$f \circ f^{-1} = (1, 1), (2, 2), (3, 3), (4, 4) \quad \checkmark$$

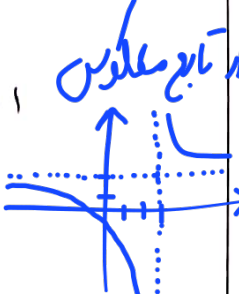
$$f^{-1} \circ f = (1, 1), (2, 2), (3, 3), (4, 4) \quad \checkmark$$

$$f \circ g^{-1} = (1, 1), (2, 2) \quad \checkmark$$

$$g^{-1} \circ f = (1, 1), (2, 2), (3, 3) \quad \checkmark$$

$$(1, \frac{1}{2}) \text{ و } (3, \frac{3}{2})$$

$$\frac{h}{f \circ g^{-1}} = (1, \frac{1}{2}) \text{ و } (3, \frac{3}{2}) \quad \checkmark$$

$f(m) = \frac{r(m+1)}{m-r}$  سریع ✓ 100 $y = \frac{r(m+1)}{m-r} \Rightarrow m = \frac{ry+1}{y-r}$	$my - rm = ry + 1$ $my - ry = rm + 1$ $y(m-r) = rm + 1$ $y = \frac{rm+1}{m-r}$  نمود تابع معلوم ✓
$f(m) = m-1 - (m-r)$ مقدار  $[1, r]$ و $[r, \infty)$ و $m-r \Rightarrow y = rm - r$ $m = ry - r$ $[1, r]$ و $[r, \infty)$ و $[a, b]$ و $a=1, b=r$ $y = \frac{m+r}{r}$	$Df = [-r, r]$ ✓ 7
$x^2 + 5; x \geq 1 \rightarrow (1) \rightarrow \min$ $fm-1; m \leq - \rightarrow (-1) \rightarrow \max$ $y = x^2 + 5 \quad y = fm-1$ $x = \sqrt{y-5} \quad x = \sqrt{y-1}$ $y = x^2 + 5 \quad y = \frac{x+1}{x}$	سریع ✓ $\sqrt{y-5}; [5, +\infty)$ ✓ $\frac{x+1}{x}; (-\infty, -1]$ ✓ 7
$y = \frac{x^2 - (m+1)^2}{m+x} \Rightarrow \frac{x^2 + 2mx + m^2 - m^2 - 2m - 1}{m+x} = \frac{-2m-1}{m+x}$ $\frac{-2m-1}{m+x} = y$ $x = \frac{-ry-1}{y+r}$ $xy + ry = -rm-1$ $y = \frac{-rm-1}{m+r}$	$\frac{-2m-1}{m+x} = \frac{ax+b}{mx+d} \Rightarrow a=-y$ $\hookrightarrow b=-r$ $f^{-1} = \frac{-y(-r)-1}{(-r)+y} = \frac{ry-1}{y-r}$ 7
$f(m) = \frac{m}{m^2+1}$ $x = \frac{y}{y^2+1}$ $xy^2 + m - y = 0$ $\frac{-b \pm \sqrt{\Delta}}{2a}$ 7	$f^{-1}(m) = \frac{1 \pm \sqrt{1-4m^2}}{2m} \quad m \leq \frac{1}{2}$ $f^{-1}(m) = \frac{1 \pm \sqrt{1-4m^2}}{2m}$ $m \leq \frac{1}{2}$