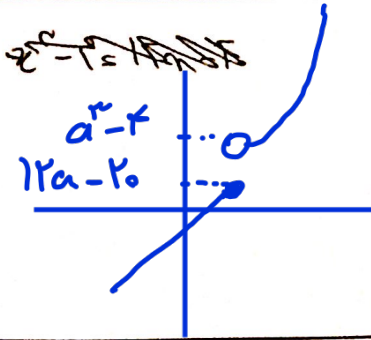




$$a^2 - 4 \geq 12a - 2$$

$$(a-2)^2(a+4) \geq 0$$

$$\frac{-4}{-1+1+} \quad \boxed{a \geq -4}$$

0
1

$f(x) \rightarrow y \rightarrow k = a \quad \frac{x-k}{a} = y \quad \frac{2-k}{a} = 5 \quad 12 = 2-k \quad k = -10$ ✓

$F(7) = 21 + (-10) = 11$ ✓ (الف)

2
2

$f(f(x)) = 2(2x-10) - 10 = 4x - 30$ ✓ (ب)

$\frac{ay}{y-1} = a \quad xy - x = ay \quad -x = y(a-1) \quad y = \frac{-x}{a-1}$

$(2a, a) \rightarrow \frac{-2a}{a-2} = a \quad a = 2$ ✓

3
2

الف) ~~...~~ $\{(2,5), (7,7), (2,2), (1,4)\}$ ✓

ج) ~~...~~ $\{(2,2), (4,4)\}^{-1} = \{(2,2), (4,4)\}$ ✓

د) ~~...~~ $\{(2,2), (4,4)\} \rightarrow \{(2,2), (4,4), (2,2), (4,4)\}$ ✓

ب) ~~...~~ $\{(2,2), (4,4), (2,2), (4,4)\}$ ✓

4
1

$f^{-1} = \{(2,2), (4,4), (2,2), (4,4)\}$ ✓

$f \circ g^{-1} = \{(2,2), (4,4), (2,2), (4,4)\} \rightarrow \{(2,2), (4,4), (2,2), (4,4)\}$ ✓

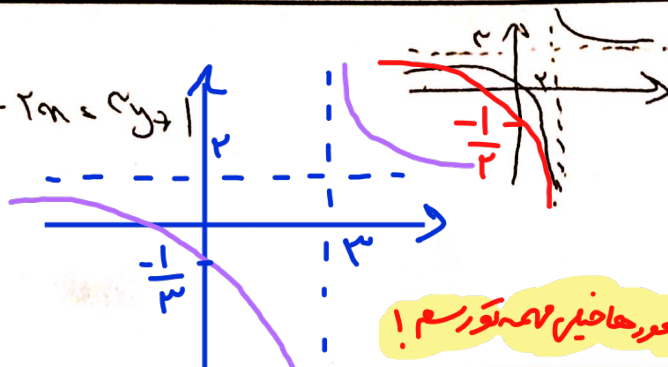
$\frac{h}{f \circ g^{-1}} = \{(2,2), (4,4), (2,2), (4,4)\} \rightarrow \{(2,2), (4,4), (2,2), (4,4)\}$ ✓

5
2

$$\frac{cy+1}{y-2} = n \quad cy-2n = cy+1$$

$$-2n = cy(c-n)$$

$$\frac{2n+1}{n-2} = y \quad \checkmark$$



محل برخورد با محورهای مختصات!

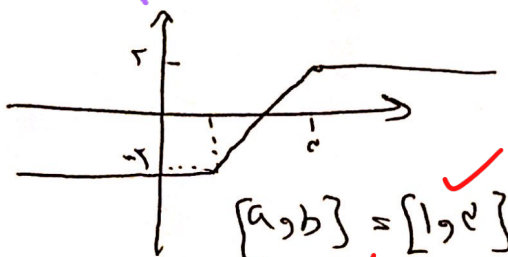
(1, 2, 5)

6

$$y-1+y-2=n$$

$$\checkmark \frac{x+4}{2} = y \rightarrow f(n)^{-1}$$

$$D = [-2, 2]$$



$$[a, b] = [1, 2] \quad \checkmark$$

همیشه وقتی معلوم تابعی را بدست می‌دهی باید دامنه‌اش را مشخص کنی!

(1, 2, 5)

7

$$y^2+2=n \quad \sqrt{x-4} = y$$

$$f(y-1)=n \quad \frac{n+1}{4} = y$$

معلوم پذیر است!

$$f \text{ بر } f$$

$$\begin{cases} \sqrt{x-4} & x \geq 4 \\ \frac{x+1}{4} & x \leq -1 \end{cases}$$

بررسی وارون پذیری! ۵ و ۵ غره

(1)

8

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

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

(2)

9

$$-cy-1=n \quad y+2n \rightarrow y(-2-n) = c(n+1)$$

$$f^{-1}(x) = \omega \rightarrow \frac{x-1}{-x+2}, \quad a = -2 \quad d = 4 \quad b = -2 \quad \checkmark$$

$$y(x^2+1) = x$$

$$yx^2 - x + y = 0$$

$$x = \frac{1 \pm \sqrt{1-4y^2}}{2y^2}$$

$$y = \frac{1 \pm \sqrt{1-4x^2}}{2x^2} \quad \checkmark \rightarrow f^{-1}(n) \quad |u| \leq \frac{1}{2} - \{0\}$$

(1, 2, 5)

10