

۲۰

-۱

الف) $n^2 - n = 2$
 $n^2 - n - 2 = 0$
 $n = -1$ $n = 2$ ✓
 غ.ق.ق

(۲)

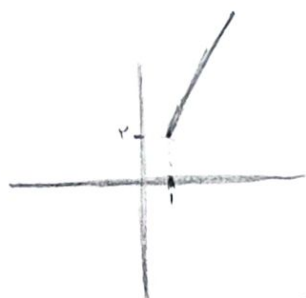
ب) $m = 2$ ✓
 $a = -1$ ✓
 $n = 2$



$1 + a \leq 2$
 $a \leq 1$ ✓

(۲)

-۲

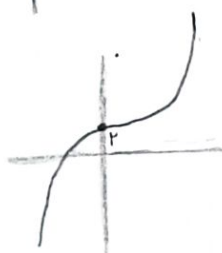


$a > 0$ $a - 1 < 2$
 $a < 3$ $\Rightarrow a < 3$ ✓

(۲)

-۳

الف)



معکوس یک به یک است $x = y^2 + 2$
 $y = \sqrt{x - 2}$ ✓

(۲)

-۴

ب) $y = \sqrt{x - 2}$ ✓
 یک به یک نیست

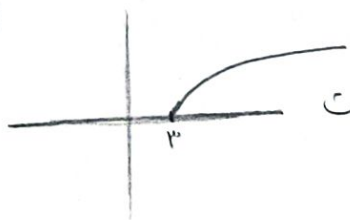
الف) تابع همگرا فیل است پس (الف) معکوس $\frac{3y+1}{y-2} = x$ $y = -\frac{-2x-1}{x-3} = \frac{2x+1}{x-3}$ ✓

-۵

ب) $y = \frac{2(x+2)}{x+2} = 2 \Rightarrow y = 2$ تابع یک به یک نیست ✓

(۲)

الف)



معکوس یک به یک است $x = \sqrt{y-3}$ $x^2 = y - 3$ $y = x^2 + 3$ $x \geq 0$ ✓

(۲)

-۶

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

$y = \sqrt{x+1} + 2$ $R_{f^{-1}} = [2, +\infty) \Rightarrow y = \sqrt{x+1} + 2$ ✓

$$y = x + \sqrt{x}$$

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

$$\sqrt{x} + \frac{1}{\sqrt{x}} = \pm \sqrt{y + \frac{1}{x}}$$

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

$$\Rightarrow f^{-1}(x) = x + \frac{1}{x} - \sqrt{y + \frac{1}{x}} \quad a=1 \quad b=\frac{1}{x} \quad c=-\frac{1}{x} \quad a+2b+c = 1 + \frac{1}{x} - \frac{1}{x} = 1$$

$$\frac{x_1}{\sqrt{x_1^2-2}} = \frac{x_2}{\sqrt{x_2^2-2}}$$

$$\frac{x_1^2}{x_1^2-2} = \frac{x_2^2}{x_2^2-2}$$

$$x_1^2 x_2^2 - 2x_1^2 = x_1^2 x_2^2 - 2x_2^2$$

$$x_1^2 = x_2^2$$

$$x_1 = \pm x_2$$

یک به یک است $x_1 = x_2$

$$\xrightarrow{\text{معکوس}} x = \frac{y}{\sqrt{y^2-2}}$$

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

$$x^2 y^2 - 2x^2 = y^2$$

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

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

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

چون x, y هم علامت اند

$$-\frac{r}{a} = \frac{x}{1+|x|}$$

$$f(-\frac{r}{a}) = -\frac{r}{a}$$

$$f(-\frac{r}{a}) + g^{-1}(-\frac{r}{a}) = -\frac{r}{a} + \frac{9}{r a} = \frac{-a^2 + 9}{r a} = -\frac{r^2}{r a}$$

$$-\frac{r}{a} - \frac{r}{a} |x| = x$$

$$-\frac{r}{a} = \sqrt{x} - 1$$

$$\sqrt{x} = \frac{r}{a}$$

$$x = \frac{9}{r^2 a^2}$$

$$g^{-1}(-\frac{r}{a}) = \frac{9}{r a}$$

(2)

$$x + \frac{r}{a} |x| = -\frac{r}{a}$$

$\Rightarrow x < 0$ (سست است)

$$\frac{r}{a} x = -\frac{r}{a}$$

$$x = -\frac{r}{a}$$

$$12 = f(x) + \sqrt{f(x)}$$

$$12 = t^2 + t$$

$$t^2 + t - 12 = 0$$

$$(t+4)(t-3) = 0$$

$$t = -4 \quad t = 3 \quad \sqrt{f(x)} = 3$$

$$f(x) = 9$$

$$g^{-1}(12) = 2$$

(2)

$$x = \sqrt[3]{9-1} = 2$$