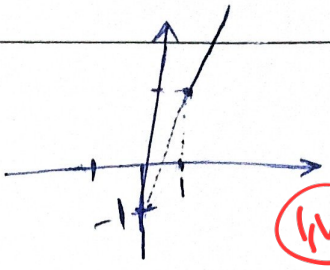
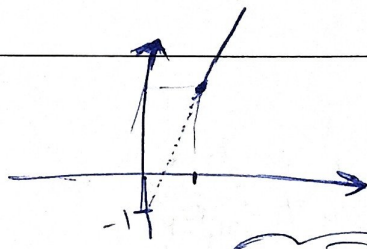
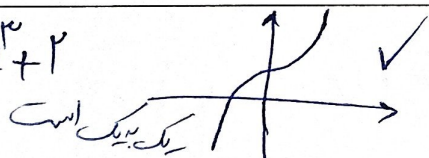


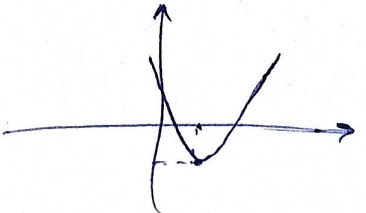
الف) $(3, 2) = (3, n^2 - n) \Rightarrow 2 = n^2 - n \Rightarrow n(n-1) = 2 \Rightarrow \begin{cases} n=2 \\ n=-1 \end{cases}$ ✓
 $(3, 2) = (m, 3) \Rightarrow m=3$

ب) $(2, 3) = (m, 3) \Rightarrow m=2 \Rightarrow (a, 2-1) = (-1, 1) \Rightarrow a=-1$
 $\Rightarrow (-1+2, n) = (1, 2) \Rightarrow n=2$ ✓

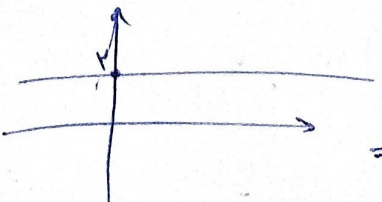
$f(x) = \begin{cases} 3x-1 & x \geq 1 \\ x+a & x < 1 \end{cases}$  $\Rightarrow 1+a \leq 2 \Rightarrow a \leq 1$ ✓

$f(x) = \begin{cases} 3x-1 & x \geq 1 \\ ax+a-1 & x \leq 0 \end{cases}$  $\Rightarrow a > 0 \Rightarrow a-1 < 2 \Rightarrow a < 3 \Rightarrow 0 < a < 3$ ✓

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

ب) $y = x^2 - 4x + 2$  $\Rightarrow$ یک به یک نیست. ✓

الف) $y = \frac{3x+1}{x-2}$ $\rightarrow$ غلط گزاشی $\rightarrow$ یک به یک است $\Rightarrow x = \frac{3y+1}{y-2} \Rightarrow y = \frac{3x+1}{x-2}$ ✓

ب) $\frac{4+2x}{x+2} = \frac{2(x+2)}{x+2} = 2$  $\Rightarrow$ یک به یک نیست. ✓

$y = \sqrt{x-r}$ → $y = x^r + r$ ✓
 b) $y = x^r - r$; $x \in [r, +\infty)$
 $-\frac{b}{ra} = \frac{z}{r} = r$
 $r - r + r = -1$
 $x = \sqrt{y-r} \Rightarrow x^r = y-r$
 $x = \pm \sqrt{y+1+r} \Rightarrow y = \pm \sqrt{x+1+r}$
 $y = x^r - r$ → $y = x^r - r + r + 1 - 1 = (x-r)^r - 1 \Rightarrow x-r = \pm \sqrt[r]{y+1}$

$y = x + \sqrt{x}$ → $x = y + \sqrt{y} + \frac{1}{2} - \frac{1}{2}$
 $x = (\sqrt{y} + \frac{1}{2})^2 - \frac{1}{2}$
 $\sqrt{y} + \frac{1}{2} = \begin{cases} +\sqrt{x+\frac{1}{2}} \checkmark \\ -\sqrt{x+\frac{1}{2}} \times \end{cases} \rightarrow \sqrt{y} = \sqrt{x+\frac{1}{2}} - \frac{1}{2} \rightarrow y = x + \frac{1}{2} + \frac{1}{2} - \sqrt{x+\frac{1}{2}} = x + \frac{1}{2} - \sqrt{x+\frac{1}{2}}$
 $a+rb+tc=1$
 $a=1 \quad b=\frac{1}{r} \quad c=-\frac{1}{2}$

$y = \frac{x}{\sqrt{x^r-r}} \rightarrow \begin{cases} y = \frac{x_1}{\sqrt{x_1^r-r}} \\ y = \frac{x_2}{\sqrt{x_2^r-r}} \end{cases} \Rightarrow \frac{x_1}{\sqrt{x_1^r-r}} = \frac{x_2}{\sqrt{x_2^r-r}} \xrightarrow{\text{cross}} \frac{x_1^r}{x_1^r-r} = \frac{x_2^r}{x_2^r-r}$
 $\Rightarrow x_1^r x_2^r - r x_1^r = x_1^r x_2^r - r x_2^r \Rightarrow x_1^r = x_2^r \Rightarrow x_1 = \pm x_2 \rightarrow x_1 \neq -x_2$
 $f(x) = x = \frac{y}{\sqrt{y^r-r}} \rightarrow x^r = \frac{y^r}{y^r-r} \rightarrow y^r x^r - r x^r = y^r \Rightarrow y^r x^r - y^r = r x^r$
 $\Rightarrow y^r = \frac{r x^r}{x^r-1} \Rightarrow y = \pm \sqrt[r]{\frac{r x^r}{x^r-1}} \quad y = \frac{\sqrt[r]{r x}}{\sqrt{x^r-1}} \checkmark$

$f^{-1}(x) = \frac{x}{1+|x|} \xrightarrow{\text{cross}} f(x): x = \frac{y}{1+|y|} \Rightarrow$
 $g(x) = \sqrt{x} - 1 \Rightarrow g^{-1}(x): x = \sqrt{y} - 1 \Rightarrow y = (x+1)^2 \Rightarrow g^{-1}(-\frac{r}{8}) = (-\frac{r}{8} + 1)^2 = \frac{9}{64}$
 $f(-\frac{r}{8}) \Rightarrow f^{-1}(x) = -\frac{r}{8} \quad \frac{Df = Rf^{-1}}{Rf = Df^{-1}} \quad \frac{x}{1+|x|} = -\frac{r}{8} \Rightarrow -r - r|x| = 8x$
 $\Rightarrow x = -\frac{r}{10} \Rightarrow f(-\frac{r}{8}) = -\frac{r}{10} \Rightarrow f(-\frac{r}{8}) + g^{-1}(-\frac{r}{8}) = -\frac{r}{10} + \frac{9}{64} = \frac{-2r}{10}$

$f^{-1}(x) = \sqrt[r]{x-1} \Rightarrow f(x) = x = \sqrt[r]{y-1} \Rightarrow x^r = y-1 \Rightarrow y = x^r + 1$
 $g(x) = x^r + 1 + \sqrt{x^r + 1} \rightarrow g^{-1}(x) = \begin{cases} x: g(x) > r \\ g^{-1}(x): g(x) \leq r \end{cases} \Rightarrow g^{-1}(1r) = Dg(x)$
 $x = Rg(x) \Rightarrow g(x) = 1r \Rightarrow 1r = x^r + 1 + \sqrt{x^r + 1} \Rightarrow x = r$
 $\Rightarrow g^{-1}(1r) = r \checkmark$