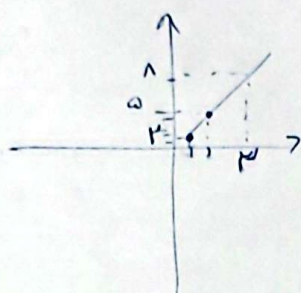
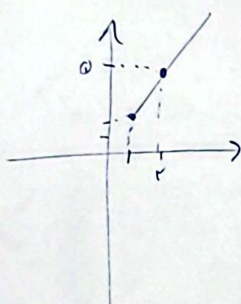


۱) $f(2,2), (n,n), (n^2-n), (n,2), (-1,n)$
 $(2,2) \in (n,n) \Rightarrow m=2 \quad (2,2) \in (n^2-n, n) \Rightarrow n^2-n-2=0 \Rightarrow n^2-n-2=0 \Rightarrow n=2$
 ۲) $f(-1,1), (1,2), (2,2), (a,n-1), (a+2,n), (n,2)$
 $(2,2) \in (n,2) \Rightarrow m=2 \quad (-1,1) \in (a,n-1) \Rightarrow a=1, n=2$
 $m=2 \Rightarrow m-1=1 \in (1,1) \in (a,1) \Rightarrow a=1$
 $a=-1 \Rightarrow a+2=1 \quad (1,2) \in (1,n) \Rightarrow n=2$



$a < 1$

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

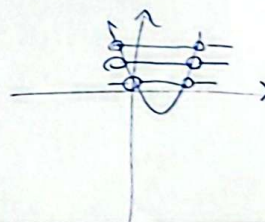


$f(x) = \begin{cases} 2x-1, & x \geq 1 \\ ax+a-1, & x < 1 \end{cases}$

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

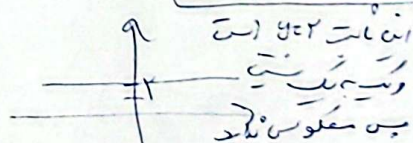
الف) $y = x^2 + 2 \Rightarrow y_1 = y_2 \Rightarrow x_1 = x_2 \Rightarrow x_1^2 + 2 = x_2^2 + 2 \Rightarrow x_1 = x_2$
 $x^2 = y - 2 \Rightarrow x = \sqrt{y-2} \Rightarrow y = x^2 + 2 \Rightarrow f(x) = x^2 + 2$

ب) $y = x^2 - 4x + 2$ (ضابطه متعلق به سهمی است)
 بنابراین یک سهمی است و در واقع متغیر است



الف) $y = \frac{2x+1}{x-2} \Rightarrow$ همگرا نیست $\rightarrow$ $\frac{2x+1}{x-2} = y \rightarrow x = \frac{-2y-1}{y-2}$
 ضابطه معکوس $y = \frac{2x+1}{x-2}$

ب) $y = \frac{2x+2}{x+2} \Rightarrow ad \neq bc \Rightarrow$ همگرا نیست
 $2 \times 2 = 4 \neq 1$



الف) $y = \sqrt{x-r} \Rightarrow x = \sqrt{y-r} \rightarrow x^2 = y-r \rightarrow$
 $f^{-1}(x) = x^2 + r$
 لعل x و y متناهيان $\rightarrow$ $x = \sqrt{y-r}$ $y = x^2 + r$

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ب) $y = x^2 - 5x + 6, x \in [r, +\infty)$

$y = x^2 - 5x + 6 + 1 - 1 \rightarrow y + 1 = x^2 - 5x + 7 - 1 \rightarrow y = (x-2)^2 - 1 \rightarrow x - 2 = \pm \sqrt{y+1}$
 $\rightarrow x = 2 \pm \sqrt{y+1} \rightarrow f^{-1}(x) = 2 + \sqrt{x+1}$

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

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

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

$a + 1b + 1c \rightarrow c = -\frac{1}{x}, b = \frac{1}{x}, a = 1 \Rightarrow 1 + 1 + (-1) = 1$

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$\frac{x_1^2}{x_1^2 - r} = \frac{x_1^2}{x_1^2 - r} \Rightarrow x_1^2(x_1^2 - r) = x_1^2(x_1^2 - r) \Rightarrow x_1^2 = x_1^2 \Rightarrow x_1 = \pm x_1$

$y = \frac{x}{\sqrt{x^2 - r}} \rightarrow x = \frac{y}{\sqrt{y^2 - r}} \rightarrow x^2 = \frac{y^2}{y^2 - r} \rightarrow y^2 x^2 = r x^2 = y^2 \Rightarrow y^2 x^2 - y^2 = r x^2$

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

$f^{-1}(x) = \frac{x}{1 + |x|} \rightarrow y = \frac{x}{1 + |x|} \rightarrow y(1 + |x|) = x \Rightarrow y + y|x| = x \xrightarrow{x \geq 0} |x| = x$

$\rightarrow y + yx = x \rightarrow x = \frac{y}{y+1} \rightarrow y = \frac{x}{x+1}$

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

$f(-\frac{r}{a}) + g(-\frac{r}{a}) \xrightarrow{\frac{r}{a} \rightarrow 0} = -\frac{r}{\sqrt{a}}$

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$y = \sqrt{x-1} \xrightarrow{y \rightarrow \infty} y^2 = x-1 \rightarrow x^2 + 1 = y$
 $y^2 + 1 = x \quad f(x) = x^2 + 1$

$g(x) = x^2 + 1 + \sqrt{x^2 + 1}$

$g^{-1}(1/2) \Rightarrow x^2 + 1 + \sqrt{x^2 + 1} \Rightarrow x = 1$

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