

(19, 15)

تصنيف سمارتي 10

ازدهم C

باران کاظمی

الف)  $f = \{(x, y), (n, \omega), (x, n^2 - n), (m, x), (-1, x)\}$

$$n^2 - n = x \Rightarrow n^2 - n - x = 0 \quad n = \frac{1 \pm \sqrt{1+4x}}{2} < \frac{x}{2} \leq x \quad \begin{matrix} m=3 \\ n=2 \end{matrix}$$

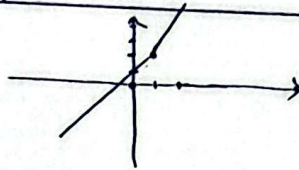
ب)  $f = \{(-1, 1), (1, x), (x, x), (a, m-1), (a+x, n), (m, x)\}$

$$m = x$$

$$a = -1$$

$$n = 2$$

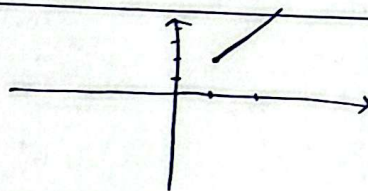
$$f(x) = \begin{cases} x^2 - 1 & ; x \geq 1 \quad \frac{1}{2} \leq \frac{x}{2} \\ x + a & ; x < 1 \quad \frac{1}{2} \leq \frac{x}{2} \end{cases}$$



$$a + 1 = 2 \Rightarrow a = 1$$

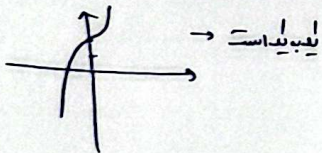
$$(-\infty, 1]$$

$$f(x) = \begin{cases} x^2 - 1 & ; x \geq 1 \quad \frac{1}{2} \leq \frac{x}{2} \\ a + x - 1 & ; x \leq 0 \end{cases}$$

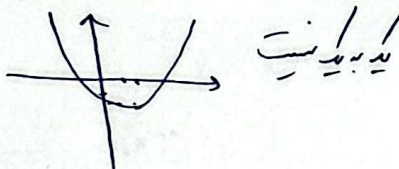


$$(0, 1) \quad a = 0$$

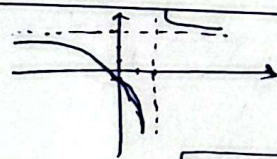
الف)  $y = x^2 + 2 \quad x = y^2 + 2 \Rightarrow y^2 = x - 2 \Rightarrow y = \sqrt{x - 2}$



ب)  $y = x^2 - x + 2$   
 $\frac{x}{2} \leq 2$   
 $x - 1 + 2 \leq 2$

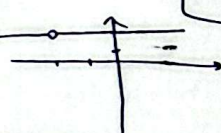


الف)  $\frac{x^2 + 1}{x - 2} = y$   $\frac{1}{x-2} = \frac{1}{y}$   
 $\frac{1}{-2} = -\frac{1}{2}$

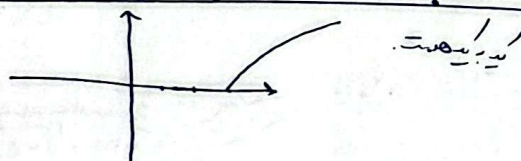


$$x = \frac{xy + 1}{y - 2} \Rightarrow xy - 2x = xy + 1 \Rightarrow y(x - 2) = 2x + 1 \Rightarrow y = \frac{2x + 1}{x - 2}$$

ب)  $y = \frac{x + 2}{x + 2} = \frac{2(x + 2)}{(x + 2)} \Rightarrow y = 2$



الف)  $y = \sqrt{x - 2}$

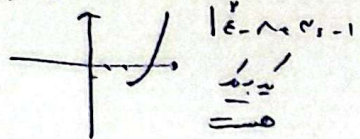


$$x = \sqrt{y - 2}$$

$$y = 2 \leq x^2$$

$$y = x^2 + 2 \quad x \geq 0$$

ج)  $y = u^r - \epsilon u + r, \quad u \in (r, +\infty)$



$y = u^r - \epsilon u + r + 1 - 1 = (u - r)^r - 1$

$u = (y - r)^r - 1 \Rightarrow (y - r)^r = u + 1 \Rightarrow y - r = \sqrt[r]{u+1} \Rightarrow y = \sqrt[r]{u+1} + r$

$f(u) = u + \sqrt{u} \quad \sqrt{u} + t^r + t^{\frac{1}{r}-1} = y \Rightarrow (t + \frac{1}{r})^r = \frac{1}{r} + y \Rightarrow u = (\sqrt{y} + \frac{1}{r})^r - \frac{1}{r}$   
 $f^{-1}(u) = au + b - \sqrt{u - c}$   
 معي  $\sqrt{u + \frac{1}{r}} = \sqrt{y} + \frac{1}{r}$

$\sqrt{y} = \sqrt{u + \frac{1}{r}} - \frac{1}{r} \xrightarrow{\text{مربع}} y = u + \frac{1}{r} + \frac{1}{r} - \sqrt{u + \frac{1}{r}} \Rightarrow y = u + \frac{1}{r} - \sqrt{u + \frac{1}{r}}$

$a = 1 \quad c = -\frac{1}{r}$   
 $b = \frac{1}{r}$   
 $a + rb + rc = 1 + 1 - 1 = 1$

$y = \frac{u}{\sqrt{u^r - r}}$

$f(u, 1) = f(u_r)$

$\frac{u_1}{\sqrt{u_1^r - r}} = \frac{u_r}{\sqrt{u_r^r - r}} \xrightarrow{\text{مربع}} \frac{u_1^r}{u_1^r - r} = \frac{u_r^r}{u_r^r - r}$

$u_1^r u_r^r - r u_1^r = u_1^r u_r^r - r u_r^r \Rightarrow u_1^r = u_r^r \Rightarrow u_1 = \pm u_r \rightarrow$  *القيمة المطلقة*

$u = \frac{y}{\sqrt{y^r - r}} \Rightarrow u^r = \frac{y^r}{y^r - r} \Rightarrow u^r y^r - r u^r = y^r \Rightarrow y^r (u^r - 1) = r u^r \Rightarrow y^r = \frac{r u^r}{u^r - 1}$

$y = \pm \frac{\sqrt{r} u}{\sqrt{u^r - 1}} \Rightarrow y = \frac{\sqrt{r} u}{\sqrt{u^r - 1}}$

$f^{-1}(u) = \frac{u}{1+|u|}$

$g(u) = \sqrt{u} - 1$

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

$f^{-1}(u) \rightarrow \frac{u}{1+|u|} = -\frac{r}{a} \Rightarrow -r - r|u| = au$

$\sqrt{u} - 1 = -\frac{r}{a} \Rightarrow \sqrt{u} \leq \frac{r}{a} \Rightarrow u \leq \frac{a^2}{r^2}$

$-\frac{r}{a} + \frac{a}{r} = \frac{-a^2 + r^2}{ra} = \frac{r^2 - a^2}{ra}$

$0u + r|u| + r = 0$

$\frac{r}{u+r} + \frac{r}{v+r}$

$u \leq -\frac{r}{r}$



$f^{-1}(u) = \sqrt{u-1}$   
 $y'' = \sqrt{u-1} \quad u = \sqrt{y-1} \Rightarrow u^2 = y-1 \Rightarrow y = u^2 + 1$

$g(u) = f(u) + \sqrt{f(u)}$

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

$g(u) = 12 \Rightarrow u = ?$

$u^2 + 1 + \sqrt{u^2 + 1} = 12$

$g^{-1}(12)$

$t^r + t - 12 = 0 \Rightarrow (t+1)(t-11) = 0$

$t = -1 \Rightarrow \sqrt{u^2 + 1} = -1$   
 $t = 11 \Rightarrow \sqrt{u^2 + 1} = 11$

$\Rightarrow u^2 + 1 = 121 \Rightarrow u^2 = 120 \Rightarrow u = \sqrt{120}$