

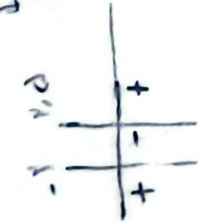
19,5 آخری

الف) $\left[\frac{(x-1)^2 - x^2}{(x-1)x} \right] \rightarrow 1-x^2 \rightarrow x = \frac{1}{x}$
 $\rightarrow x=1$
 $\rightarrow x=0$

ب) $\frac{x^2 - x - 1}{(x+1)x} \rightarrow x = -1$
 $\rightarrow x = 0$

$\frac{3x^2 + 4x + 1}{(x-1)(x+1)} \rightarrow x = -\frac{1}{3}$
 $\rightarrow x = 1$
 $x = -1$

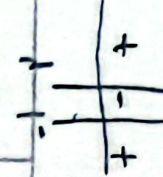
الف) $f(x) = \left[\frac{1}{x} \cdot x - 9 \right] (x^2 - 1)$



$x = -1$
 $x = 0$
 $x = 1$
 $x = 3$

$(-\infty, -1] \cup [3, +\infty)$

$f(x) = \log_f(x^2 - x)$



$x^2 - x - 1 = 0$
 $(x-1)(x+1) = 0$
 $x = 1$
 $x = -1$



$(-\infty, -1] \cup [1, +\infty)$

$f(x) = \sqrt{x^2 + a} + x$

$-1 \Rightarrow -1 - 2a + 1 = 0$

$a = -\frac{1}{2}$
 $-x^2 - \frac{1}{2}x + 1 = 0$
 $x = \frac{1}{2}$
 $b + a = 1$

$g(x) = \sqrt{f(x) - x}$

① $\rightarrow \sqrt{2x + 1} - x \Rightarrow \sqrt{x + 1}$

$x > 1 \rightarrow x > -1 \rightarrow -1 < x < 1$

② $\rightarrow \sqrt{3x - 1} - x \Rightarrow \sqrt{x - 1}$

$x > 1$

①

$(-\infty, 0) \cup [\frac{1}{2}, +\infty)$

②

$R = \{ -1, 0, -\frac{1}{2}, 1 \}$

③

$\sqrt{\frac{x}{x-1}} + \sqrt{y+1} = 3$
 $\sqrt{\frac{x}{x-1}} \leq \frac{3}{2}$
 $a + b = 3$
 $a \leq 3$

$D_f = [1, 8]$

④

$(-\infty, -1) \cup (1, +\infty) = ((-\infty, -1) \cup (1, +\infty))$
 $\rightarrow (-\infty, -1] \cup [1, +\infty)$

⑤

1/5

⑧

$$f\left(\frac{\sqrt{r}}{r}+1\right) \rightarrow r(x^r)-t(x)$$

$$r\left(\frac{r}{r}+\sqrt{r}+1\right)-r\sqrt{r}-t = -\frac{1}{r}$$

⑨

$$f(f(a))=a$$

$$\hookrightarrow \frac{\frac{a+1}{a-1}+1}{\frac{a+1}{a-1}-1} = \frac{\frac{ra}{a-1}-t}{\frac{r}{a-1}} = a \quad R: \{1\}$$

⑩

$$f(g(a)) = -t$$

$$\sqrt{a^r-1} = t$$

$$\left(\sqrt{a^r-1}\right)^r - t\sqrt{a^r-1} = -t \rightarrow t^r - t = -t$$

$$(t^r - t)^r = 0 \quad t = r \rightarrow \sqrt{a^r-1} = r$$

$$a = \pm \sqrt{a}$$

⑪

$$f(t) \times f(-r)$$

$$f(-r) \stackrel{x=-r}{\Rightarrow} r^2 + r^2 + r = r^r \quad f(t) \stackrel{x=r}{\Rightarrow} 1 - r + r = r$$

⑫

$$f(t \cos x + a \cos x) = t \tan r$$

$$\cos x = t$$

$$t + a + a t = r^r a \quad t + r + 1 \cdot t - r t = 0$$

$$t + r + 1 \cdot t - a t = 0 \quad t = \frac{1}{1+r} \quad t = -\frac{r}{1+r}$$

$$1 + \tan r = \frac{1}{\frac{1}{1+r}} \rightarrow \tan r = \frac{r}{1+r}$$

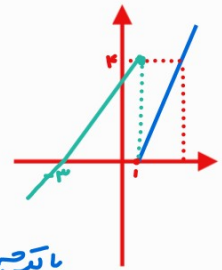
⑬

$$f(n) - n = \begin{cases} 3n - 2 - n & n \geq 1 \\ 3n + 3 - n & n < 1 \end{cases} = \begin{cases} 2n - 2 & n \geq 1 \\ n + 3 & n < 1 \end{cases}$$

$$f(n) - n \geq 0 \rightarrow \begin{cases} 2n - 2 \geq 0 \rightarrow n \geq 1 \checkmark \\ n + 3 \geq 0 \xrightarrow{n < 1} -3 \leq n < 1 \checkmark \end{cases}$$

$$\rightarrow D_f = [-3, +\infty)$$

باینجه به سید نیز مشخص است!



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