

۲. آفرین عالی نوشتار

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الف) $\frac{x-1}{x} - \frac{x}{x-1} \geq 0$

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

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

ب) $x \neq -1$ $x \neq 0$ $x \neq 1$ $x \neq -2$

$$\frac{x}{x-1} + \frac{1}{x+2} \neq 0$$

$$D_f = \mathbb{R} - \left\{ -\frac{\Delta}{f}, -1, -1, 0, 1 \right\}$$

$$\frac{x(x+2)+x-1}{(x-1)(x+2)} = \frac{x^2+4+x-1}{(x-1)(x+2)} = \frac{x^2+x+3}{(x-1)(x+2)} \neq 0$$

الف) $\left(\left(\frac{1}{x}\right)^x - 9\right)(x^x - 9) \geq 0$

$$\left(\frac{1}{x}\right)^x \neq 9$$

$$x \neq 2$$

$$x \neq 2/9$$

$$x \neq -2$$

$$\frac{-2}{x} \neq 2/9$$

$$D_f = \mathbb{R} - (-2, 2/9)$$

$$\Rightarrow \sqrt{y+1} < y - \sqrt{x-1}$$

$$x-1 \geq 0$$

$$y \geq -1$$

$$\boxed{x \geq 1}$$

$$y - \sqrt{x-1} \geq 0$$

$$\sqrt{x-1} \leq y$$

$$x-1 \leq y^2$$

$$\boxed{x \leq y^2 + 1}$$

$$\boxed{D_f = [1, +\infty[}$$

D

$$x^2 - x - r > 0$$

$$(x+1)(x-r) > 0$$

$$\frac{-1}{+} \frac{r}{-}$$

$$D_f = (-\infty, -1) \cup (r, +\infty)$$

$$D_f \cap \mathbb{R} = [-1, r]$$

$$\sqrt{x^2 - 1} + 1 \neq 0$$

$$\sqrt{x^2 - 1} \neq -1$$

o.t.m

o

$$x = -r$$

$$r + a(-r) - (-r)^2 - ra - 1 \geq 0$$

$$-ra \leq 1$$

$$a \leq -\frac{1}{r}$$

$$-x^2 - \frac{1}{r}x + r,$$

$$-rx^2 - x + 4 \geq 0$$

$$-x^2 - x + 17 \geq 0$$

$$-(x^2 + x - 17) \leq 0$$

$$(x-2)(x+5)$$

$$\frac{-1}{-} \frac{r}{+}$$

$$b \leq \frac{r}{r}$$

$$a \leq -\frac{1}{r}$$

$$a + b \leq \frac{r}{r} - \frac{1}{r} \geq 1$$

$$a \leq -\frac{1}{r} \quad b \leq \frac{r}{r}$$

$$f(x) = \begin{cases} rx - r & x \geq 1 \\ rx + r & x < 1 \end{cases}$$

① $x \geq 1 \rightarrow \sqrt{rx - r - x} \geq \sqrt{rx - r} \quad rx - r \geq 0 \quad x \geq 1 \xrightarrow{*} x \geq 1$

② $x < 1 \rightarrow \sqrt{rx + r - x} \geq \sqrt{rx + r} \quad rx + r \geq 0 \quad x \geq -r \xrightarrow{*} -\frac{r}{r} \leq x < 1$

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

$$D_g = [-r, +\infty)$$

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$$-x^2 - x + 11 = 0$$

$$-(x^2 + x - 11) = 0$$

$$(x - r)(x + f)$$

$$w(x) = \frac{x}{r} \quad r = 1$$

$$-\frac{1}{r} + \frac{1}{f}$$

$$b = \frac{r}{f}$$

$$a = -\frac{1}{f}$$

$$a + b < \frac{r}{f} = \frac{1}{f} < 1$$

$$f(x) = \begin{cases} rx - r & x \geq 1 \\ rx + r & x < 1 \end{cases}$$

① $x \geq 1 \rightarrow \sqrt{rx - r} \geq \sqrt{rx - r} \quad rx - r \geq 0 \quad x \geq 1 \xrightarrow{*} x \geq 1$

② $x < 1 \rightarrow \sqrt{rx + r} \geq \sqrt{rx + r} \quad rx + r \geq 0 \quad x \geq -r \xrightarrow{*} x < 1$

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

$$D_f = [-r, +\infty)$$

$$\sin \frac{\pi}{r} = \frac{\sqrt{r}}{r}$$

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

$$\cos \pi = -1$$

$$\frac{1+\sqrt{r}-1-\sqrt{r}}{r} = \frac{-1}{r}$$

$$f\left(\frac{a+1}{a-1}\right) \geq a \rightarrow \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} \geq a \rightarrow \frac{\frac{a+1+a-1}{a-1}}{\frac{a+1-a+1}{a-1}} \geq a$$

$$a \geq 1$$

$$f(x) = x^r - rx$$

$$g(x) = \sqrt{x^r - 1}$$

$$-f(x) = x^r - rx \quad x^r - rx + 1 < 0$$

$$(x-r)^r < x^{2r}$$

$$r < \sqrt{a^r - 1} \rightarrow a^r - 4 < 4 \rightarrow a^r < 8 \rightarrow a < \sqrt[3]{8} = 2$$

$$L(x+r) = x^r - dx + 4 \quad \textcircled{1} \quad x < 1 \quad f(x) < 1 - d(1) + 4 > r$$

$$\textcircled{2} \quad x < -4 \quad f(-r) = r^r - d(-4) + 4 > r$$

$$f(x) < f(-r) < r < r < 1 < f$$

$$f(r \cos^2 x + d \cos x) \geq \tan^2 x \rightarrow f \cos^2 x + d \cos x \geq \frac{1}{f}$$

$$f \cos^2 x + d \cos x - \frac{1}{f} < 0 \quad (f \cos x - 1) \left(f \cos x + \frac{1}{f} \right) < 0$$

$$\textcircled{1} \quad \cos x \geq \frac{1}{f} \rightarrow \sin x \geq \pm \frac{\sqrt{f}}{f}, \quad \cos x \geq \frac{1}{f} \quad \text{obviously}$$

$$\textcircled{2} \quad \cos x \geq -\frac{1}{f} \quad \text{obviously}$$

$$\text{min } [-1, 1] \quad \text{obviously}$$

$$\tan^2 x \geq r \quad \text{obviously}$$

$$f(r/d)$$

$$\frac{1}{f} \tan^2 x \geq \frac{1}{f} \rightarrow \tan^2 x \geq 1 \rightarrow \tan x \geq 1$$

$$\tan^2 x \geq r \geq f(r/d)$$