

Subject:

Year.

Month.

Date.



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تلف صوتی، آنتن، بازده مضرب (C):

①

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

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

Sign chart: $\frac{0}{1} \quad \frac{1}{-} \quad \frac{1}{+}$

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

ب) $\begin{cases} x \neq -1 & x \neq 1 \\ x \neq 0 & x \neq -2 \end{cases}$

$$\frac{x}{x-1} + \frac{1}{x+2} = 0 \rightarrow \frac{x}{x-1} \leq \frac{-1}{x+2} \rightarrow 2x^2 + 5x - 1 \geq 0$$

$x = -2 \rightarrow x = -\frac{5}{2}$

$$D_f = \mathbb{R} - \left\{ -\frac{5}{2}, -2, 0, 1, 2 \right\}$$

②

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

$$x = -2$$

$$\hookrightarrow x \leq \frac{0}{p}$$

Sign chart: $\frac{-}{-} \quad \frac{0}{p} \quad \frac{+}{+}$

$$D_f = (-\infty, -2] \cup [2, +\infty)$$

$$x - \sqrt{x-1} \geq 0 \rightarrow \sqrt{x-1} \leq x \rightarrow x-1 \leq x^2$$

$$x^2 - x + 1 \geq 0 \quad \Delta = -3 < 0 \quad \text{Always true}$$

ب) $D_f = [2, +\infty)$

③

$$x^p - x - p > 0 \rightarrow (x-p)(x+1) > 0$$

Sign chart: $\frac{-}{-} \quad \frac{p}{+} \quad \frac{+}{+}$

$$x^p - 1 \geq 0 \quad x^p \geq 1 \rightarrow x \geq 1$$

$$D_f = (-\infty, -1) \cup (2, +\infty)$$

④ ①

$$x^2 + ax - x^p \geq 0$$

$$x^2 - pa - x = 0$$

$$(x^2 - pa - x) \leq -p$$

$$-pa = 1 \rightarrow a = -\frac{1}{p}$$

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

$$-x^p - \frac{1}{p}x + x^2 = 0 \rightarrow p = -2$$

$$\hookrightarrow b = \frac{1}{p}$$

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$$f(x) - x \geq 0 \rightarrow f(x) \geq x$$

$$\text{if } x \geq 1 \rightarrow x^p - x \geq 0 \rightarrow x^p \geq x \rightarrow \boxed{x \geq 1}$$

$$\text{if } x < 1 \rightarrow x^p + x \geq 0 \rightarrow \boxed{x \geq -x^p}$$

$$O_p \in [-x^p, 1) \cup [1, +\infty) \subseteq [-x^p, +\infty)$$

$$f\left(\sin \frac{\pi}{p} + \cos p \pi\right) = p(x^p - px)$$

$$\frac{\sqrt[p]{p}}{p} \quad 1 \quad \hookrightarrow p([x-1]^p - 1) \rightarrow px \frac{-1}{p} = \left(\frac{-1}{p}\right)$$

$$\left(\frac{\sqrt[p]{p}}{p}\right)^p \rightarrow \frac{p}{p}$$

$$f\left(\frac{a+1}{a-1}\right) = a \rightarrow \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \frac{\frac{pa}{a-1}}{\frac{p}{a-1}} = a$$

$$a = \mathbb{R} - \{1\}$$

$$f(\sqrt{a^p-1}) = \frac{t^p}{a^p-1} - f\sqrt{a^p-1} = -f$$

$$t^p - \Sigma t + \Sigma = -$$

$$t = p \rightarrow \sqrt{a^p-1} = p \rightarrow a^p = \omega$$

$$a = \pm \sqrt[p]{\omega}$$

$$f(x+p) = (x-p)(x-p)$$

$$f(-p) = -1 \times -9 = 9p$$

$$f(f) = -1 \times -p = p$$

$$UP \times P = 1FF$$

(10) (11)

$$f \cos^p + \omega \cos - p, \omega = 0$$

$$\cos^p + \omega \cos - 1K = -$$

$$(\cos_n + v) (\cos_n - p) = -$$

$$\tan^p \frac{\pi}{p} = \frac{p}{p}$$

$$\cos \frac{\pi}{p} \leq \frac{1}{p} \rightarrow \alpha = \frac{\pi}{p}$$

HIRAD