

الف) $\frac{x-1}{x} - \frac{x}{x-1} \geq 0$ $\frac{x-1}{x} - \frac{x}{x-1} \geq 0$
 $x \neq 0, 1 \rightarrow$ منوع منقسم شود $\frac{x^2-1-x^2}{x(x-1)} \geq 0 \rightarrow \frac{-1}{x(x-1)} \geq 0$
 $(-\infty, 0) \cup (\frac{1}{x}, 1)$

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

$\sqrt{((\frac{1}{x})^x - 9)(32 - 4^x)} \geq 0$
 $(\frac{1}{x})^x - 9 \geq 0 \rightarrow (\frac{1}{x})^x \geq 9 \rightarrow x \geq -2$
 $32 - 4^x \geq 0 \rightarrow 4^x \leq 32 \rightarrow x \leq \frac{5}{2}$
 $D = [-2, \frac{5}{2}]$
 $\sqrt{x-1} + \sqrt{y+1} = 3 \rightarrow \sqrt{y+1} = 3 - \sqrt{x-1} \rightarrow 3 - \sqrt{x-1} \geq 0 \rightarrow \sqrt{x-1} \leq 3 \rightarrow x-1 \leq 9 \rightarrow x \leq 10$
 $x \geq 1$
 $D = [1, 10]$

$\log_f(x^2 - x - 2) > 0 \rightarrow (x-2)(x+1) > 0$
 $\frac{-1}{x-2} < \frac{-1}{x+1} \rightarrow D = (-\infty, -1) \cup (2, +\infty)$
 $\sqrt{x^2-1} + 1 \neq 0$
 $\sqrt{x^2-1} = -1 \times$
 $\oplus$ هبوط

$3 + (-2)a - r = 0$
 $-2a = 1$
 $a = -\frac{1}{2}$

$\sqrt{3 + \frac{1}{x}x - x^2}$
 $3 + (-\frac{1}{x})b - b^2 = 0$
 $a + b = -\frac{1}{x} + \frac{x}{x} = 1$
 $\Delta = \frac{1}{x^2} - 4(-1)(3) = \frac{12}{x^2}$
 $b = \frac{\frac{1}{x} \pm \sqrt{\frac{12}{x^2}}}{-2} = \frac{\frac{1}{x} \pm \frac{2\sqrt{3}}{x}}{-2} = \frac{1 \pm 2\sqrt{3}}{-2x}$
 $b = \frac{1 - 2\sqrt{3}}{-2x}$
 $b = \frac{1 + 2\sqrt{3}}{-2x}$

$x \geq 1 \rightarrow \sqrt{3x-2-x}$
 $3x-2-x \geq 0 \rightarrow 2x \geq 2 \rightarrow x \geq 1$

$x < 1 \rightarrow \sqrt{2x+3-x}$
 $2x+3-x \geq 0 \rightarrow x \geq -3$
 $D = [-3, 1)$

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

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

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$$f(a) = \frac{a+1}{a-1} \rightarrow f(f(a)) = \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \alpha$$

$$\frac{\frac{r a}{a+1+a-1}}{\frac{r \leftarrow a+1-a+1}{a-1}} = \frac{\frac{r a}{a-1}}{\frac{r}{a-1}} = \alpha$$

$$a \neq 1 \quad D = R - \{1\}$$

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

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

$$a^r - 1 - r \sqrt{a^r - 1} + r = 0$$

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

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

$$|a^r - 1| = r$$

$$a^r - 1 = r \rightarrow a^r = r + 1$$

$$a = \pm \sqrt[r]{r+1}$$

$$a^r - 1 = -r \rightarrow a^r = -r + 1$$

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$$f(x+r) = x^r - 2x + r$$

$$f(r) = 1 - 2r + r = r$$

$$\hookrightarrow x+r = r$$

$$(x \geq 1)$$

$$f(-r) = r^4 + r^0 + r = r^4 + r$$

$$\hookrightarrow x+r = -r$$

$$x = -r$$

$$f(r) \times f(-r) = r \times r^4 = r^5$$

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

$$r \cos^r x + a \cos x = r, a$$

$$r \cos^r x + a \cos x - r, a = 0$$

$$\hookrightarrow \cos^r x + a \cos x - r = 0$$

$$(\cos x + r)(\cos x - r) = 0$$

$$\cos x = -r$$

$$\cos x = r$$

$$\frac{\cos x}{r} = -1$$

$$\frac{\cos x}{r} = 1$$

$$\tan^r + 1 = \frac{1}{\cos^r x}$$

$$\tan^r = r - 1 = \frac{r}{r-1}$$

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