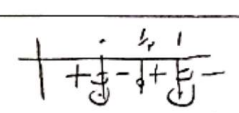


الف) $f(x) = \sqrt{\frac{1+x^2-2x-x^2}{x(x-1)}} \rightarrow \frac{1-2x}{x(x-1)} \geq 0$ 
 $D_f = (-\infty, 0) \cup [1, +\infty)$

ب) $f(x) = \frac{\frac{1}{x+1} - \frac{2}{x}}{\frac{3}{x-1} + \frac{1}{x+2}} = \frac{\frac{x-2x-2}{x(x+1)}}{\frac{3x+4+x-1}{(x-1)(x+2)}} = \frac{-x-2}{\frac{4x+5}{(x-1)(x+2)}}$ $\frac{1}{x} = 4 \rightarrow x = -4$ $\frac{1}{x} = 9 \rightarrow x = \frac{1}{9}$
 $D_f = \{0, -2, -\frac{5}{2}\} \cup \mathbb{R} \setminus \{-2, -1, -\frac{5}{2}\}$

الف) $f(x) = \sqrt{((\frac{1}{x})^x - 9)(x^2 - 2x)}$ $\frac{1}{x} = 9 \rightarrow x = -\frac{1}{9}$ $\frac{1}{x} = 4 \rightarrow x = \frac{1}{4}$
 $D_f = (-\infty, -\frac{1}{9}] \cup [\frac{1}{4}, +\infty)$

ب) $\sqrt{x-1} + \sqrt{y-2} = 3 \rightarrow \sqrt{y-2} = 3 - \sqrt{x-1} \rightarrow y-2 = 9 - 6\sqrt{x-1} + x-1 \rightarrow y = x+8 - 6\sqrt{x-1}$
 $D_f = [1, 17]$

$f(x) = \log_{\frac{1}{2}}(x^2 - x - 2)$ $x^2 - x - 2 > 0 \rightarrow (x-2)(x+1) > 0 \rightarrow x < -1 \text{ or } x > 2$
 $D_f = (-\infty, -1) \cup (2, +\infty)$

$x^2 + (x-b)x - pb$ $- (x+b)(x-b) = -x^2 - (x-b)x + pb$ $x^2 - x - 2 > 0 \rightarrow (x-2)(x+1) > 0 \rightarrow x < -1 \text{ or } x > 2$
 $D_f = (-\infty, -1) \cup (2, +\infty)$

$g(x) = \sqrt{f(x) - x} \rightarrow f(x) - x \geq 0 \rightarrow f(x) \geq x$ $x \geq 1 \rightarrow x^2 - 2x \geq x \rightarrow x^2 - 3x \geq 0 \rightarrow x \geq 3$
 $D_f = [-3, +\infty)$

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

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

$$f\left(\sin \frac{\pi}{r} + \cos \frac{\pi}{r}\right)$$



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

$$\frac{a(a-1)}{a-1} = a \rightarrow \mathbb{R} - \{1\}$$

$$a \neq 1$$

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

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

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

$$\sqrt{a^r - 1} = r \rightarrow a^r - 1 = r^2 \rightarrow a = \pm \sqrt[r]{r^2 + 1}$$

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$$f(x) \times f(-x) = \sqrt{r} \times r = 12\varepsilon$$

$$x + r = \varepsilon \rightarrow x = 1$$

$$x + r = -r \rightarrow x = -4$$

$$f(x) = (1)^r - \omega(1) + 4 = r$$

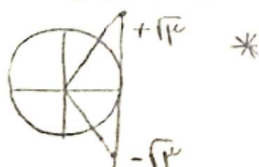
$$f(-x) = (-4)^r - \omega(-4) + 4 = \sqrt{r}$$

U, i, u, b

$$f(x) = x^r - \omega x + 4$$

9

$$f(r, \omega) = t a t^r x = (\pm \sqrt{r})^r = \boxed{r}$$



$$r \cos^r x + \omega \cos x = r^2 \omega$$

$$r \cos^r x + \omega \cos x - r^2 \omega = 0$$

$$\cos^r x + \omega \cos x - 1\varepsilon = 0$$

$$(\cos x - 1)(\cos x + 1) = 0$$

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



$$x = r k \pi + \frac{\pi}{r}$$

$$x = r k \pi - \frac{\pi}{r}$$

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