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الف) $f(x) = \sqrt{\frac{x-1}{x} - \frac{x}{x-1}} \geq 0$

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

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

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

ب) $f(x) = \frac{1}{x+1} - \frac{x}{x-1} \rightarrow x \neq 0$
 $\frac{1}{x+1} + \frac{1}{x-1}$
 $x \neq 1 \rightarrow x \neq -1$

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

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

الف) $f(x) = \sqrt{[(\frac{1}{x})^x - 4]} (x^2 - 4^x)$

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

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

ب) $\sqrt{x-1} + \sqrt{y+1} = 3$

$\sqrt{y+1} = 3 - \sqrt{x-1}$

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

$\sqrt{x-1} \leq 3 \rightarrow x-1 \leq 9 \rightarrow x \leq 10$

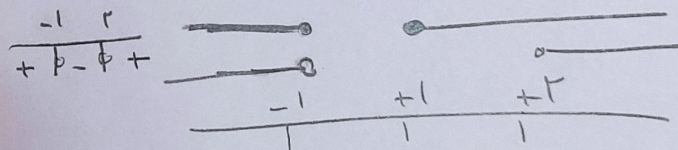
$D_f = [1, 10]$

$f(x) = \frac{\log_f(x^2 - x - 2)}{\sqrt{x^2 - 1} + 1} \rightarrow (x^2 - x - 2) > 0 \rightarrow (x-2)(x+1) > 0$

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

$\rightarrow x^2 - 1 \geq 0$

$D_f = (-\infty, -1) \cup (1, +\infty)$
 $x^2 \geq 1 \rightarrow x \geq 1$
 $x \leq -1$



$\sqrt{x^2 + ax - x^2} \geq 0 \rightarrow D_f = [-1, 1]$
 $x^2 + ax - x^2 \leq 0$
 $(x^2 + 2)(x - b) \leq 0$
 $-2x - 2 = -4$
 $b = \frac{1}{2}$

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

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

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$$f(0) = ?$$

$$(n+r)f(n) - r_n f(n+r) = r_n r_{-m} + r_{m-1}$$

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$$n=0 \rightarrow r f(0) = (r_{m-1}) \rightarrow f(0) = \frac{r_{m-1}}{r}$$

$$n=-r \rightarrow r f(0) = 1 + r_m + r_{m-1}$$

$$r f(0) = 1 + r_m \rightarrow f(0) = \frac{r_m + 1}{r}$$

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

$$r_m - 1 = r_m + 1$$

$$r_m = 1$$

$$r_m = a \rightarrow m = \frac{a}{r}$$

$$f(0) = r \times \frac{r_m - 1}{r} = \frac{r r_m}{r}$$

$$f(x) \rightarrow a x + b$$

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$$f(n) \rightarrow f\left(\frac{1}{n}\right) = \frac{r_n r_{-1} - (r_n + r)}{n}$$

$$\rightarrow n = -1 \Rightarrow r f(-1) = \frac{r + 1 + r}{-1}$$

$$f(-1) = ?$$

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

$$f(-1) = -\frac{1}{r}$$