

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

$$Df = (-\infty, \frac{1}{2}] \cup (0, 1)$$

$$\text{ب) } x \neq 1, x < 0, x = -1$$

$$\frac{x}{x-1} + \frac{1}{x+1} \neq 0 \Rightarrow \frac{x(x+1) + (x-1)}{(x-1)(x+1)} \neq 0$$

$$3x+1+x-1 \rightarrow 4x+0 \neq 0 \Rightarrow 4x \neq 0 \Rightarrow x \neq 0$$

$$\Rightarrow Df = \mathbb{R} - \{0\} - \{1\} - \{-1\} - \{\frac{1}{2}\} - \{\frac{1}{3}\} - \{\frac{1}{4}\}$$

$$\left(\left(\frac{1}{x}\right)^x - 9\right) (32 - x^x) \geq 0 \quad x = -2, x = \frac{5}{2}$$

$$\begin{array}{c|c|c} - & \frac{5}{2} & \\ \hline + & - & + \end{array}$$

$$\text{ب) } (\sqrt{y+1})^5 = (3 - \sqrt{x-1})^5 \rightarrow y+1 = 9 + \sqrt{x+1} - 9\sqrt{x-1}$$

$$y = 8 + \sqrt{x+1} - 9\sqrt{x-1}$$

$$x+1 \geq 0 \rightarrow x \geq -1 \rightarrow [-1, +\infty) \cap \rightarrow [1, +\infty)$$

$$x-1 \geq 0 \rightarrow x \geq 1 \rightarrow [1, +\infty)$$

$$x^2 - x - 2 \geq 0 \quad (x-2)(x+1)$$

$$x=2 \quad x=-1$$

$$\begin{array}{c|c|c} - & 2 & \\ \hline + & - & + \end{array} \rightarrow (-\infty, 1) \cup [2, +\infty) \text{ (1)}$$

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

میشود

$$\text{(1) } \cap \text{(2) } \rightarrow (-\infty, -1) \cup (2, +\infty) \text{ (3)}$$

$$\sqrt{x^2 - 1} \Rightarrow x^2 - 1 \geq 0 \quad x^2 \geq 1 \quad |x| \geq 1 \rightarrow x \geq 1 \rightarrow (-\infty, 1) \cup [1, +\infty) \text{ (2)}$$

$$3 + ax - x^2 \rightarrow 3 - 2a - 1 \rightarrow -2a - 1 \geq 0 \rightarrow -2a \geq 1 \rightarrow -a \geq \frac{1}{2} \rightarrow a \leq -\frac{1}{2} \rightarrow a = -\frac{1}{2}$$

$$3 - \frac{1}{x} - x^2 \rightarrow \Delta = \frac{1}{x^2} - 4(-1)(3) \rightarrow \frac{12}{x^2} \quad \omega \frac{p}{q} = \frac{-b \pm \sqrt{\Delta}}{2a}$$

$$\frac{\frac{1}{x} + \frac{1}{x}}{-2} = \frac{\frac{2}{x}}{-2} = -\frac{1}{x} \text{ (2)}$$

$$\frac{\frac{1}{x} - \frac{1}{x}}{-2} = \frac{\frac{0}{x}}{-2} = \frac{0}{-2} = 0 \text{ (3)}$$

$$\begin{array}{c|c|c} - & \frac{3}{x} & \\ \hline - & + & - \end{array}$$

$$\Rightarrow [-\frac{1}{x}, \frac{3}{x}]$$

$$a = -\frac{1}{x} \quad b = -2 \rightarrow a+b = -\frac{1}{x} - 2 = -\frac{2x+1}{x} \text{ (4)}$$

$$a = -\frac{1}{x} \quad b = \frac{3}{x} \rightarrow a+b \rightarrow -\frac{1}{x} + \frac{3}{x} = \frac{2}{x} \text{ (1)}$$

$$f(x) - x \geq 0 \quad 3x - 2 - x \rightarrow 2x - 2 \geq 0 \quad 2x \geq 2 \rightarrow x \geq 1 \text{ (1)}$$

$$3x + 3 - x \rightarrow x + 3 \geq 0 \quad x \geq -3 \text{ (2)}$$

$$\begin{cases} x \geq 1 \rightarrow 3x - 2 \text{ (3)} \\ x < 1 \rightarrow 3x + 3 \text{ (4)} \end{cases}$$

$$\text{(1) } \cap \text{(2) } \cap \text{(3) } \cap \text{(4)} \rightarrow \emptyset$$

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

$$(ra+r)(1) = ra-f+a$$

$$1ra+1f = ra-f$$

$$10a = -1f$$

$$a = \frac{-1f}{10} \Rightarrow \underline{a = -1,1}$$

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$$rf(x) - rf(-x) = \varepsilon x^5 - x$$

$$\begin{cases} rf(x) - rf(-x) = \varepsilon x^5 - x \\ rf(-x) - rf(x) = \varepsilon x^5 + x \end{cases} \rightarrow \begin{cases} rf(x) - rf(-x) = 1x^5 - 2x \\ rf(-x) - rf(x) = 1x^5 + x \end{cases}$$

$$\begin{aligned} -2f(x) &= 1x^5 - x \\ \Rightarrow f(x) &= -\frac{1}{2}x^5 + \frac{x}{2} \end{aligned}$$

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$$x=0 \Rightarrow f(x) - 0 = rm - 1 \rightarrow f(x) = \frac{rm-1}{r}$$

$$x=-1 \rightarrow 0 + rf(0) = 1q + rm + rm - 1 \Rightarrow rf(0) = 2m + 1q$$

$$f(0) = \frac{2m+1q}{r}$$

$$\Rightarrow f(0) = \frac{2m+1q}{r} = \frac{rm-1}{r}$$

$$f(0) = \frac{12(9)+10}{7}$$

$$10m + 1q = 1qm - 1 \rightarrow 1q = qm \Rightarrow m = 9 \Rightarrow \underline{f(0) = 110}$$

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

$$rf(-1) = \frac{r+1r+r}{-1} \rightarrow rf(-1) = -1r$$

$$\Rightarrow \underline{f(-1) = -9}$$

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