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الف) $\frac{(x-1)x - x(x-1)}{x(x-1)} = \frac{x^2 - x - x^2 + x}{x(x-1)} = \frac{0}{x(x-1)} \Rightarrow D_f = \mathbb{R} - \{1, 0\}$

ب) $\frac{x^2 - 2x - 2}{(x+1)(x)} = \frac{(-x-2)(x-1)(x+2)}{(x+5)(x)(x+1)} \Rightarrow D_f = \mathbb{R} - \{-\frac{5}{2}, -1, 0\}$

الف) $\left(\left(\frac{1}{x}\right)^2 - 9\right)(x^2 - 4) \geq 0$

$\frac{-2}{+} \frac{2}{-}$

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

ب) $\sqrt{y+1} = 3 - \sqrt{x-1}$

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

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

$x-1 \leq 1 \rightarrow x \leq 2$

$D_f = [1, 2]$

① $x^2 - x - 2 > 0 \rightarrow (x-2)(x+1) > 0$ $\frac{x}{-1} \frac{-2}{+} \frac{2}{+} (-\infty, -1) \cup (2, +\infty)$

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

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

if $x = -2 \rightarrow -4 - 2a + 2 = 0 \rightarrow -2a - 1 = 0 \rightarrow a = -\frac{1}{2}$

$-x^2 - \frac{x}{2} + 2 \geq 0 \rightarrow x^2 + \frac{x}{2} - 2 \leq 0$ $\frac{x}{-2} \frac{-2}{+} \frac{4}{+} [-2, \frac{4}{2}]$

$a + b = \frac{1}{2} + \frac{4}{2} = \frac{5}{2}$

$f(x) \begin{cases} x^2 - 2 & x \geq 1 \\ x^2 + 3 & x < 1 \end{cases} \rightarrow g(x) \begin{cases} \sqrt{x^2 - 2} & x \geq 1 \rightarrow x^2 - 2 \geq 0 \rightarrow [2, +\infty) \\ \sqrt{x^2 + 3} & x < 1 \rightarrow x^2 + 3 \geq 0 \rightarrow [-\sqrt{3}, +\infty) \end{cases}$

$D_f = [-\sqrt{3}, +\infty)$

$$P((a+1)(a+1)) = Pa - P + a \rightarrow P(Va + V) = Pa - P \rightarrow 1Pa - Pa = -P - 1$$

$$10a = -11 \rightarrow \boxed{a = -1/11}$$

$$\sqrt{P - \sqrt{P}} + \sqrt{P + \sqrt{P}} + P + \sqrt{P + \sqrt{P}} + \sqrt{P - \sqrt{P}} + P = P \left(\underbrace{\sqrt{P - \sqrt{P}} + \sqrt{P + \sqrt{P}}}_m \right) + P$$

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$$m^2 = P - \sqrt{P} + P + \sqrt{P} + P \sqrt{(P - \sqrt{P})(P + \sqrt{P})} = 4 \rightarrow m = \sqrt{4}$$

$$\boxed{P\sqrt{4} + P}$$

$$\begin{aligned} P f(x) - P f(-x) &= Px^P - x \\ P f(-x) - P f(x) &= Px^P + x \end{aligned} \rightarrow \begin{aligned} + P f(x) - P f(-x) &= Px^P - Px \\ - P f(x) + P f(-x) &= 1Px^P + Px \end{aligned}$$

$$-2P f(x) = 10x^P + x \rightarrow \boxed{f(x) = -Px^P - \frac{x}{2}}$$

$$\begin{aligned} \text{if } x = -P &\rightarrow 4 f(0) = 14 + Pm + Pm - 1 \Rightarrow 4 f(0) = 14 + 2m \\ \text{if } x = 0 &\rightarrow P f(0) = Pm - 1 \xrightarrow{\times P} 4 f(0) = 9m - P \end{aligned}$$

$$14 + 2m = 9m - P \rightarrow m = P/7 \Rightarrow f(0) = \frac{9 \times \frac{P}{7}}{4} - \frac{P}{4} = \boxed{\frac{4P}{28}}$$

$$f(-1) + f\left(\frac{1}{-1}\right) = \frac{P + 1P + P}{-1} \rightarrow P f(-1) = -11 \rightarrow \boxed{f(-1) = -9}$$

$$\int_0^{\infty} \frac{1}{x} dx$$