

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

$$x(x-1) = 0 \Rightarrow x = 0 \text{ or } x = 1$$

$$1-2x = 0 \rightarrow 1 = 2x \rightarrow x = \frac{1}{2}$$

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

$$\text{ب) } x \neq -1, x \neq 0$$

$$\frac{3}{x-1} + \frac{1}{x+2} = \frac{3x+4+x-1}{x^2-x-2} = \frac{4x+3}{x^2-x-2} \neq 0 \rightarrow \frac{-3}{x^2-x-2}$$

$$x \neq 1, x \neq -2$$

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

$$\text{الف) } \left(\frac{-x}{3} - \frac{2}{3}\right) \left(\frac{\infty}{2} - \frac{2x}{2}\right) \geq 0$$

$$-2 \quad \frac{2}{2}$$

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

$$+ \quad - \quad +$$

$$\text{ب) } \sqrt{y+1} = 3 - \sqrt{x-1} \rightarrow y+1 = (3 - \sqrt{x-1})^2$$

$$y = (3 - \sqrt{x-1})^2 - 1$$

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

$$3 - \sqrt{x-1} \geq 0 \rightarrow \sqrt{x-1} \leq 3 \rightarrow x-1 \leq 9 \rightarrow x \leq 10$$

$$Df = [1, 10]$$

$$Df = (-\infty, -2] \cup [\frac{2}{3}, +\infty)$$

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

$$\frac{-1}{+} \quad \frac{2}{-}$$

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

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

$$\frac{-1}{+} \quad \frac{1}{-}$$

$$(-\infty, -1) \cup (1, +\infty)$$

$$Df = (-\infty, -1) \cup (1, +\infty)$$

$$\sqrt{x^2-1} \neq 1 \checkmark$$

$$3 - 2a - 4 = 0 \quad -1 = 2a \rightarrow a = -\frac{1}{2}$$

$$3 - \frac{1}{2}x - x^2 = 0 \rightarrow -x^2 - \frac{1}{2}x + 3 = 0$$

$$(x+1) \left(-x + \frac{6}{2}\right) \rightarrow \frac{b}{a} = \frac{6}{-1} = -6$$

$$\sqrt{2x-5} \quad x \geq \frac{5}{2}$$

$$-3 \leq x$$

$$\sqrt{x+3} \quad x < 1$$

$$x \geq -3$$

$$\left. \begin{array}{l} x < 1 \\ x \geq -3 \end{array} \right\} -3 \leq x < 1$$

$$\sin \frac{\pi}{4} + \cos 2\pi = \frac{\sqrt{2}}{2} + 1 = \frac{2+\sqrt{2}}{2}$$

$$x \times \left(\frac{1+\sqrt{2}}{2}\right)^2 - 4 \times \frac{2+\sqrt{2}}{2}$$

$$x \times \frac{1+2+2\sqrt{2}}{2} - \frac{4+2\sqrt{2}}{1} = \frac{1+2+2\sqrt{2}}{2} - 2 - \sqrt{2} = -1$$

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

$$\frac{a+1}{a-1} = 1 \rightarrow a+1 = a-1 \quad x = \frac{-a-1}{1-a} = \frac{a+1}{a-1}$$

$$\frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \frac{\frac{a+1+a-1}{a-1}}{\frac{a+1-a-1}{a-1}} = \frac{2a}{2} = a \rightarrow R \rightarrow \text{PF} = R - \{1\}$$

$$a-1 \neq 0 \rightarrow a \neq 1$$

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

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

$$-a^{\frac{r}{2}} + 10a^{\frac{r}{2}} - r\omega = 0 \rightarrow a^{\frac{r}{2}} - 10a^{\frac{r}{2}} + r\omega = 0$$

$$a^{\frac{r}{2}} + 9 + 4a^{\frac{r}{2}} = 14a^{\frac{r}{2}} - 14$$

$$a^r = t \rightarrow t^r - 10t + r\omega = 0 \rightarrow (t - \omega)^r = 0 \rightarrow t = \omega$$

$$a = \pm \sqrt{\omega}$$

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

$$f(-r) \rightarrow x + r = -r \rightarrow x = -4 \rightarrow 14 + r_0 + 4 = vr \quad \times \} \text{ (14r)}$$

$$r \cos^r + \omega \cos = r\omega \rightarrow r \cos^r + \omega \cos - r\omega = 0 \xrightarrow{\omega, 1} \cos^r x + \omega \cos x - 1r = 0$$

$$\cos x = \frac{-1}{\frac{r}{\omega}} \text{ , } \frac{r}{\omega}$$

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

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

$$\tanh^r x = \frac{1}{\cos^r x} - 1 \rightarrow \frac{1}{\frac{1}{r}} = r - 1 = r$$