

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

$$\begin{matrix} x-1 \neq 0 \rightarrow x \neq 1 \\ x \neq 0 \end{matrix} \quad \begin{matrix} -2x + 1 = 0 \\ -2x = -1 \\ x = \frac{1}{2} \end{matrix}$$

$$\begin{aligned} \hookrightarrow) \quad & \frac{1}{x+1} - \frac{1}{x} = \frac{x - (x+1)}{x(x+1)} = \frac{-1}{x(x+1)} \rightarrow \frac{1}{x(x+1)} \\ & \frac{1}{x-1} + \frac{1}{x+1} = \frac{(x+1) + (x-1)}{(x-1)(x+1)} = \frac{2x}{(x-1)(x+1)} \end{aligned}$$

الف) $\left(\left(\frac{1}{r} \right)^x - 9 \right) (r^x - r^x) \geq 0$. $D(f) = (-\infty, -1] \cup [1, \infty)$ $r^x - r^x = 0 \rightarrow r^x = (r^x)^x$
 $\left(\frac{1}{r} \right)^x - 9 = 0 \rightarrow \left(\frac{1}{r} \right)^x = 9 \rightarrow (r)^x = \left(\frac{1}{r} \right)^{-x} +$
 $x = -2$

b) $\sqrt{x-1} + \sqrt{y+1} = 3$
 ① $x-1 \geq 0 \rightarrow x \geq 1$ ② $y+1 \geq 0 \rightarrow y \geq -1$
 $x \in [1, \infty)$, $y \in [-1, \infty)$

$$f(x) = \log_e (x^2 - x - 2) \quad x^2 - x - 2 > 0 \rightarrow (x-2)(x+1) \left[\begin{array}{l} x=2 \\ x=-1 \end{array} \right]$$

$$\sqrt{x^2-1} + 1 \rightarrow \sqrt{x^2-1} + 1 \neq \rightarrow \sqrt{x^2-1} \neq -1 \rightarrow \text{divulsa}$$

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

$$(-\infty, -1) \cup (1, +\infty) \cap (-\infty, -1] \cup [1, +\infty) \Rightarrow (-\infty, -1) \cup (1, +\infty)$$

$$f(x) = \sqrt{r + ax - x^r} \quad r + a(-r) - (-r)^r = 0$$
$$\downarrow$$
$$r - ra - r = a \rightarrow ra = -1 \rightarrow a = -\frac{1}{r}$$
$$f(x) = \sqrt{-x^r - \frac{x}{r} + r}$$
$$\frac{1}{f} = \frac{f'(r)(-1)}{\frac{1}{f^2}} = \left[\frac{f'g}{f^2} \right] \Rightarrow \frac{V}{Y} \left[\begin{array}{l} \frac{\frac{1}{r} + \frac{V}{r}}{-r} = \frac{+\frac{1}{r}}{-\frac{r}{1}} = \frac{-1}{r} = -\frac{1}{r} \\ \frac{\frac{1}{r} - \frac{V}{r}}{-r} = \frac{-\frac{q}{r}}{-\frac{r}{1}} = \frac{-q}{-r} = \frac{r}{r} \end{array} \right] \rightarrow b$$

$$\sqrt{f(x)-x} \rightarrow f(x)-x \geq 0 \rightarrow f(x) \geq x \quad f(x) = \begin{cases} x-1 & x \geq 1 \\ x+1 & x < 1 \end{cases}$$

$$\left\{ \begin{array}{l} x-1 \geq x \rightarrow x \geq 1 \rightarrow x \geq 1 \\ x+1 \geq x \rightarrow x \geq -1 \end{array} \right\} \Rightarrow D(f) = [-1, +\infty)$$

$$f(x) = rx^r - rx$$

$$\Rightarrow f\left(\frac{\sqrt{r}+r}{r}\right)$$

$$r \left(\frac{\sqrt{r}+1}{r} \right)^r - f \left(\frac{\sqrt{r}+1}{r} \right) \\ \times \left(\frac{r+f+f\sqrt{r}}{r} \right) - \frac{f\sqrt{r}-1}{r} = \frac{r + \cancel{f\sqrt{r}} - \cancel{f\sqrt{r}} - 1}{r} = \frac{-1}{r}$$

$$f(\underbrace{f(a)}_K) = a$$

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

$$f\left(\frac{a+1}{a-1}\right) = a \Rightarrow \frac{\frac{a+1}{a-1} + \frac{a-1}{a-1}}{\frac{a+1}{a-1} - \frac{a-1}{a-1}} \cdot \frac{\frac{r_1}{a-1}}{\frac{r}{a-1}} = \frac{r_1}{r} = a$$

$$a-1 \neq 0 \Rightarrow a \neq 1 \quad D(f) = \mathbb{R} - \{1\}$$

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

$$f(x) = x^r - rx$$

$$f(\underbrace{g(a)}_k) = -f \Rightarrow f(k) = -f \rightarrow k^r - f k = -f \rightarrow k^r - f k + f = 0 \rightarrow \underbrace{(k-r)}_{k=r}^r = 0$$

$$\Rightarrow g(a) = 2 \rightarrow \sqrt{a^2 - 1} = 2 \rightarrow a^2 - 1 = 4 \rightarrow a^2 = 5 \rightarrow a = \pm \sqrt{5}$$

$$f(x+r) = x^r - \Delta x + c$$

$$f(r) \times f(-r) = 1 \times 1 = 1 \text{ f f}$$

$$f(f) \Rightarrow x + r = f \rightarrow x = 1 \rightarrow 1 - 4 + 9 = 6$$

$$f(-r) \rightarrow x + r = -r \rightarrow x = -4 \quad \rightarrow \quad r_9 + r_{-4} + 9 = 14$$

$$f(r \cos x + \Delta \cos x) = \tan^{-1} x$$

$$f(r, 0)? \quad \cos x = 0,8 \rightarrow x = 40^\circ$$

$$\begin{aligned} x &= 4^\circ \\ \sin 4^\circ &= \frac{\sqrt{x}}{x} \\ \cos 4^\circ &= \frac{1}{x} \\ \tan 4^\circ &= \sqrt{x} \end{aligned}$$

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

$$f\left(\frac{y}{y} + \frac{\Delta}{y}\right) = n$$

$$f\left(\frac{y}{x} = r, \theta\right) = r.$$

$$r \cos^2 \alpha + \Delta \cos \alpha = r, 0$$

$$r \cos' \alpha + \Delta \cos \alpha - r, \delta = 0, \sqrt{\lambda_1}$$

$$\left[\begin{aligned} & -\Delta + \sqrt{\Delta^2 - F(\epsilon)} \left(-\frac{1}{\sqrt{0}} \right) = \frac{-\Delta + 9}{1} = 9 \\ & -\Delta - \sqrt{\Delta^2 - F(\epsilon)} \left(-\frac{1}{\sqrt{0}} \right) = \frac{-\Delta - 9}{1} = -9 \end{aligned} \right]$$

$$-1 \leq \cos x \leq 1 \quad \text{--- also}$$