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$$y = \sqrt{\frac{x-1}{x} \cdot \frac{x}{x-1}}$$

$$\frac{x-1}{x} \cdot \frac{x}{x-1} \geq 0$$

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

$$\frac{0}{+} \quad \frac{1}{-} \quad \frac{1}{+}$$

$$x \in [\frac{1}{2}, 1) \cup (-\infty, 0]$$

$$y = \frac{\frac{1}{x+1} - \frac{2}{x}}{\frac{2}{x-1} + \frac{1}{x+2}} = \frac{\frac{x-2x-2}{x(x+1)}}{\frac{2x+7+x-1}{(x-1)(x+2)}} = \frac{\frac{-x-2}{x(x+1)}}{\frac{3x+6}{(x-1)(x+2)}}$$

$$= \frac{(x-2)(x+2)(x+1)}{(3x+6)(x-1)(x+2)}$$

$$x \neq \{0, -1, \frac{2}{3}, 1, -2\}$$

2)

ان

$$f(x) = \sqrt{(\frac{1}{x}-9)(32-5x)}$$

$$(\frac{1}{x}-9)(32-5x) \geq 0$$

مع

$$\frac{-9}{+} \quad \frac{32}{-} \quad \frac{5}{+}$$

$$D_y = (-\infty, -2] \cup [2/5, +\infty)$$

$$\sqrt{x-1} + \sqrt{y+1} = 2$$

$$D_f = [1, 12]$$

$$\sqrt{y+1} = 2 - \sqrt{x-1} \rightarrow x-1 \geq 0 \rightarrow x \geq 1$$

$$\sqrt{y+1} \geq 0$$

$$y \geq -1$$

$$2 - \sqrt{x-1} \geq 0$$

$$x-1 \leq 4 \rightarrow x \leq 5$$

$$x \leq 12$$

$$x \geq 1$$

$$x \leq 5$$

$$x \leq 12$$

$$x \leq 12$$

$$x \leq 12$$

$$x \leq 12$$

$$x \leq 12$$

$$x \leq 12$$

$$x \leq 12$$

1)

$$f(x) = \frac{\log|x^2 - x - 1|}{\sqrt{x^2 - 1} + 1}$$

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

$$(x-1)(x+1) \geq 0$$

$$\frac{-1}{r} \frac{r}{r^2 - 1} + 1$$

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

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

2)

$$f(x) = \sqrt{r + ax - x^2} \rightarrow D_f = [-r, b]$$

$$-x^2 + ax + r \geq 0$$

$$x = -r$$

$$r + a(-r) - (-r)^2 \geq 0$$

$$a = \frac{1}{r}$$

$$-x^2 - \frac{1}{2}x + r \geq 0$$

$$-(x+r)(1-\frac{r}{r}) \geq 0$$

$$a + b = 1$$

$$\frac{-r}{-1} + \frac{r}{1} \rightarrow b = \frac{r}{r}$$

3)

$$f(x) = \begin{cases} rx - r & x \geq 1 \\ rx + r & x < 1 \end{cases}$$

$$g(x) = \sqrt{f(x) - x}$$

$$x \geq 1 \rightarrow g(x) = \sqrt{rx - r} \rightarrow x \geq 1 \quad (1)$$

$$x < 1 \rightarrow g(x) = \sqrt{rx + r} \rightarrow x \geq -r \rightarrow -r \leq x < 1 \quad (2)$$

$$(1) \cup (2) = -r \leq x < 1 \rightarrow D_f = [-r, +\infty)$$

71

$$f(x) = 2x^2 - 2x$$

$$\sin \frac{\pi}{2} = \frac{\sqrt{2}}{2}$$

$$c. 32\pi = 1 \left\{ f\left(1 + \frac{\sqrt{2}}{2}\right) = 2\left(\frac{2 + \sqrt{2}}{2} - 2 \cdot \frac{\sqrt{2}}{2}\right) \right. \\ \left. = 2\left(\frac{2 - \sqrt{2}}{2}\right) = \frac{2 - \sqrt{2}}{1}\right\}$$

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

$$f(f(a)) = a$$

$$f\left(\frac{a+1}{a-1}\right) = \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \frac{\frac{2a}{a-1}}{\frac{2}{a-1}} = a$$

هنا، یزوار
مفقط $a \neq 1$ باید
باشد

$$\{12 - \frac{1}{2}\}$$

73

$$f(x) = x^2 - 2x$$

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

$$f(g(a)) = -2$$

$$f(\sqrt{a^2 - 1}) = -2$$

$$a^2 - 1 - 2\sqrt{a^2 - 1} = -2$$

$$a^2 - 1 - 2\sqrt{a^2 - 1} + 2 = 0$$

$$(\sqrt{a^2 - 1} - 2)^2 = 0$$

$$a^2 = 5$$

$$a = \pm \sqrt{5}$$

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$$f(x^2) = x^2 - \omega x + 4$$

$$x^2 + y = f \rightarrow f(x) =$$

$$x = -4 \rightarrow f(-4) = 4^2 \rightarrow f(-4) \times f(4) =$$

$$x = 1 \rightarrow f(1) = 4$$

$$4 \times 4 = 16$$

1.)

$$f(\sec x + \omega \csc x) = \tan^2 x$$

$$f(\sec \omega) = ?$$

$$\sec x + \omega \csc x = \sec \omega$$

$$\sec x + \omega \csc x - \sec \omega = 0$$

$$\sec x + 1 \cdot \csc x - \sec \omega = 0$$

$$\csc x = \frac{1}{\sec \omega}$$

$$\rightarrow 1 + \sec \omega \csc \omega = 0$$

$$\sec x = \frac{1}{\csc \omega}$$

$$\sin^2 x + \csc^2 x = 1$$

$$\sin^2 x = \frac{1}{\csc^2 x}$$

$$\rightarrow \tan^2 x = \frac{\sin^2 x}{\csc^2 x} = \frac{1}{\csc^2 x}$$

$$= 3$$