

$$\text{الف)} \quad \frac{x-1}{x} - \frac{x}{x-1} \geq 0 \Rightarrow \frac{x^2 - 2x + 1 - x^2}{x^2 - x} \geq 0 \Rightarrow \frac{0}{+ \phi - \phi + \phi} -$$

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

$$\text{ب)} \quad x \neq -1, 0, 1, -2, \quad \frac{x}{x-1} + \frac{1}{x+2} \neq 0 \Rightarrow \frac{x^2 + 2 + x - 1}{x^2 + x - 2} \neq 0 \Rightarrow$$

$$x \neq -\frac{3}{4} \quad D_f = \mathbb{R} - \{-1, 0, 1, -2, -\frac{3}{4}\}$$

$$\text{الف)} \quad \left(\left(\frac{1}{x} \right)^x - 9 \right) (x^2 - 4) \geq 0 \Rightarrow \frac{-x^2}{+ \phi + \phi +} \quad D_f = \mathbb{R} - (-2, 2/5)$$

$$\text{ب)} \quad x-1 \geq 0 \Rightarrow x \geq 1 \quad D_f = [1, \infty)$$

$$x^2 - x - 2 > 0 \quad \frac{-1 \quad 2}{+ \phi - \phi +}$$

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

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

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

$$-x^2 + ax + 3 = -(x+2)(x-b) = -x^2 - (2-b)x + 2b \Rightarrow$$

$$2b = 3 \Rightarrow b = 1/2$$

$$-(2-b) = a \Rightarrow a = -3/2 \quad b+a = 1/2 - 3/2 = -1$$

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

$$\xrightarrow{x \leq 1} 2x + 3 - x \geq 0 \quad x \geq -3$$

$$D_f = [-3, \infty)$$

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

$$r \left(\frac{\sqrt{r}+r}{r} \right)^2 - r \left(\frac{\sqrt{r}+r}{r} \right) = \frac{r+2\sqrt{r}+r}{r} - \sqrt{r}-r =$$

$$r/r + \sqrt{r} - \sqrt{r} - r = -r/0$$

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$$f(a) = \frac{a+1}{a-1}, \quad f(f(a)) = \frac{\frac{a+1}{a-1}+1}{\frac{a+1}{a-1}-1} = a$$

$a \neq 1$

$$\frac{a+1}{a-1} - 1 = \frac{a+1-a+1}{a-1} = \frac{2}{a-1}$$

$a \neq 1$

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$$\frac{ra}{a-1} = a \Rightarrow \frac{ra}{r} = a$$

$$R - \{1\}$$

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

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

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$$a = \pm \sqrt{2}$$

$$f(f) = f(1+r) = 1-0+9 = 10$$

$$f(-r) = f(-9+r) = 81+30+9 = 120$$

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$$f(f) \times f(-r) = 10 \times 120 = 1200$$

$$r \cos m + 0 \cos n = r/0 \quad r t^2 + 0 t - \frac{r}{r} = 0$$

$$\frac{a \times c}{a \times c} \rightarrow t^2 + 0 t - 1 = 0 \rightarrow t = \pm \frac{r}{r} \times \frac{1}{r}$$

$$\rightarrow t = \frac{r}{r} \cos a = \frac{1}{r} \Rightarrow a = \frac{1}{r} \pm \frac{\pi}{r}$$

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$$\tan^2(90^\circ) = (\sqrt{r})^2 = r$$

90°, 180°