

الف) $\frac{x-1}{x} - \frac{x}{x-1} \geq 0$

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

$$(x-1)^2 \geq x^2$$

$$x^2 - 2x + 1 \geq x^2 \rightarrow 2x \leq 1$$

$$D_f = (-\infty, \frac{1}{2}]$$

$$x \leq \frac{1}{2}$$

ب) $\frac{3}{x-1} + \frac{1}{x+2} \neq 0$

$$\frac{3}{x-1} \neq -\frac{1}{x+2}$$

$$3x+4 \neq -x+1$$

$$4x \neq -3$$

$$x \neq -\frac{3}{4}$$

$$R = \{-\frac{3}{4}\}$$

الف) $((\frac{1}{x})^x - 9) \times (3x - 4x) \geq 0$

$$(\frac{1}{x})^x - 9 = 0 \quad 3x - 4x = 0$$

$$(x^{-1})^x = 9 \quad x^x = 3x$$

$$x - x = 3x$$

$$x = -2 \quad 2x = 2$$

$$x = 2, 2$$

ب) $x-1 \geq 0$

$$x \geq 1$$

$$x+1 \geq 0$$

$$x \geq -1$$

$$[1, \infty)$$

$$[1, \infty)$$

الف) $\log_f(x^2 - x - 2) > 0$

$$x^2 - x - 2 > 0$$

$$(x-2)(x+1) > 0$$

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

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

ب) $\sqrt{x^2 - 1} \rightarrow x^2 - 1 \geq 0$

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

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

$$(-\infty, -1] \cup [1, \infty)$$

① و ②

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

$x^2 - 3 + a x - x^2 = 0$

$$3 - 2a - 2 = 0$$

$$-2a = 1$$

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

$b = -b^2 - \frac{a}{1} b + 3 = 0$

$$\Delta = (3, 0)^2 - 4 \times (3) \times (-1)$$

$$\Delta = \sqrt{12, 24} \rightarrow 3, 2$$

$$\frac{-3, 2 \pm 3, 2}{2} = \rightarrow -2 \times \frac{3, 2}{2}$$

$$\rightarrow 1, 2$$

$\frac{3}{2} - \frac{1}{2} = 1 = a+b$

الف) $\sin x \geq x$

$$x \geq 1$$

$$2x \geq 2$$

$$x \geq 1$$

$$f(x) \geq x$$

$$f(x) \geq x$$

ب) $x+3 \geq x$

$$x \geq -3$$

$$-3 \leq x < 1$$

②

$$[-3, \infty)$$

$$\sin \frac{\pi}{3} = \frac{\sqrt{3}}{2}$$

$$x^2 = 1^2 + \left(\frac{\sqrt{3}}{2}\right)^2 + 2 \times 1 \left(\frac{\sqrt{3}}{2}\right) = 1 + \frac{3}{4} + \sqrt{3} \rightarrow x = \frac{\sqrt{3}}{2} + \sqrt{3}$$

$$\cos 2\pi = 1$$

$$2x^2 = \frac{3}{2} + 2\sqrt{3}$$

$$\frac{3}{2} + 2\sqrt{3} - 2\sqrt{3} = -\frac{1}{2}$$

$$f \times (1 + \frac{\sqrt{3}}{2}) = f + 2\sqrt{3}$$

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

بالا آورده می کنیم $f(a) = 1$
 $\mathbb{R} - \{1\} \leftarrow \frac{a+1}{a-1} = 1$
 $a+1 = a-1$
 $2 = 0$ $\times$ $\rightarrow$

$$f(f(a)) = \frac{f(a)+1}{f(a)-1} \Rightarrow \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \frac{\frac{a+1+a-1}{a-1}}{\frac{a+1-a-1}{a-1}} = \frac{\frac{2a}{a-1}}{\frac{0}{a-1}} = \frac{2a}{0} = a$$

$$f(a) - 1 \neq 0 \Rightarrow f(a) \neq 1$$

در $\mathbb{R}$ منتهی $f(a)$ می باشد

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

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

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

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

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

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

$$(x - y)^2 = 0 \quad x = y \quad a = \pm \sqrt{a^2 - 1}$$

و $\sqrt{a^2 - 1} \geq 0$ $a \geq 1$

$$x = -4 \quad f(-4) = 16 - (-4) + 4 = 24$$

$$x = 1 \quad f(1) = 1 - 1 + 4 = 4$$

$$f(4) \times f(-4) = 24 \times 4 = 96$$

$$f \cos^2 x + \Delta \cos x = 1/2$$

$$f \cos^2 x + \cos x - 1/2 = 0$$

$$\cos^2 x + \Delta \cos x - 1/4 = 0$$

$$\left(\cos - \frac{1}{4}\right) \left(\cos + \frac{1}{4}\right)$$

$$\cos = \frac{1}{4} \quad \cos = -\frac{1}{4} \quad \times \text{فقط } \cos$$

$$\tan^2 = \frac{1}{\cos^2} - 1$$

$$\frac{1}{\frac{1}{f}} - 1 = f - 1 = 3$$