

نمبره تالیف: ۵

مقطع: یازدهم و سیزدهم

نام و نام خانوادگی: امیرعلی بیگم

۱۹۷۵ ~ آذرین

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

x	0	1
پارس	+	-

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

ب) $\frac{x}{x-1} + \frac{1}{x+2} = 0 \rightarrow \frac{3x + 2 + x - 1}{(x-1)(x+2)} = 0 \rightarrow x \neq -\frac{1}{3}$
 $\rightarrow D_g = \mathbb{R} - \{0, -1, 1, -2, -\frac{1}{3}\}$

الف) $(x^2 - 9)(x^2 - 2x) \geq 0$

x	-2	0	2
پارس	+	-	+

 $D_h = (-\infty, -2] \cup [2, +\infty)$

ب) $\sqrt{x+1} = 3 - \sqrt{x-1}$
 $\rightarrow \sqrt{x-1} \leq 3 \rightarrow 0 \leq x-1 \leq 9 \rightarrow 1 \leq x \leq 10 \rightarrow D_w = [1, 10]$

الف) $\frac{x^2 - x - 2}{\sqrt{x^2 - 1} + 1} \rightarrow x^2 - x - 2 > 0 \rightarrow x > 2, x < -1$
 $x^2 - 1 \geq 0 \rightarrow x \geq 1, x \leq -1$
 $\sqrt{x^2 - 1} + 1 \neq 0$
 $\rightarrow D_z = (-\infty, -1) \cup (2, +\infty)$

ب) $x = -2 \rightarrow 3 - 2x - \epsilon = 0 \rightarrow a = -\frac{1}{2} \rightarrow -x^2 - \frac{x}{2} + 3 = 0$
 $x = \frac{\frac{1}{2} \pm \sqrt{\frac{1}{4} + 12}}{-2} = x = \frac{\frac{1}{2} \pm \frac{5}{2}}{-2} \rightarrow b = \frac{3}{2} \rightarrow a+b = 1$

الف) $f(x) = x \geq 0 \rightarrow$

x	-2	0	2
پارس	-	+	+

 $\rightarrow D_d = [-2, +\infty)$
 $3x - 2 = x \rightarrow x = 1$
 $2x + 3 = x \rightarrow x = -3$

$$f(\sin \frac{\pi}{2} + \cos 2\pi) = f(\sin 40^\circ + \cos 40^\circ)$$

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

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

$$a-1 \neq 0$$

$$\frac{a+1}{a-1} - 1 \neq 0 \text{ (true)} \rightarrow \text{domain} = \{a \mid a \in \mathbb{R}, a \neq 1\}$$

$$|a^x - 1| < \varepsilon \rightarrow a^x - 1 = \varepsilon \rightarrow a^x = 1 + \varepsilon$$

$$a^x - 1 = -\varepsilon \rightarrow a^x = 1 - \varepsilon \rightarrow \ln(a^x) = \ln(1 - \varepsilon)$$

$$a^x - 1 = \varepsilon \rightarrow a = \pm \sqrt[x]{1 \pm \varepsilon}$$

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

$$x > \varepsilon$$

$$x = 1$$

$$x^2 - 2x + 2 = 1 \Rightarrow x = 1$$

$$x > -\varepsilon$$

$$x = -\varepsilon$$

$$x^2 - 2x + 2 = 1 \Rightarrow x = 1$$

$$\varepsilon \cos x + \sin x - 1 = 0 \rightarrow \cos x + \sin x - 1 = 0$$

$$(\cos x - 1)(\cos x + 1) = 0 \rightarrow \cos x = 1 \text{ or } \cos x = -1 \rightarrow -1 \leq \cos x \leq 1 \rightarrow \cos x = -1$$

$$\rightarrow x = \frac{\pi}{2} \rightarrow \tan \frac{\pi}{2} = \infty$$

$$\log_{\varepsilon} \frac{n^x - n - x}{\varepsilon} \rightarrow n^x - n - x > 0 \rightarrow (n-x)(n+1) > 0 \rightarrow \frac{-1}{\varepsilon} \rightarrow n > x \geq n < -1$$

$$\sqrt{n^x - 1} + 1 \rightarrow \sqrt{n^x - 1} \rightarrow n^x - 1 > 0 \rightarrow n \geq 1 \leq n < -1$$

$$[1, \infty) \rightarrow n < -1, n > x \rightarrow D_f = (-\infty, -1) \cup (x, \infty)$$