

هوی مخصوصی

$$x \neq 0 \text{ و } x \neq 1$$

(1)

$$\frac{x-1}{x} - \frac{x}{x-1} > 0 \rightarrow \frac{(x-1)^2 - x^2}{x(x-1)} > 0 \quad \text{الف}$$

(15)

$$x=0, x=1, x=1/2$$

باید تین علامت ننا!

(-∞, -1/2)

+ (-1/2, 0)

(0, 1/2) منفی

(1/2, ∞) مثبت

$$\begin{array}{c} 0 \quad 1/2 \quad 1 \\ + \quad - \quad + \quad - \end{array}$$

$$D_f = (-\infty, 0) \cup [1/2, 1)$$

$$x \neq -1, x \neq 0, x \neq 1, x \neq -2$$

(ب)

$$\frac{x^3}{x-1} + \frac{1}{x+2} = 0 \rightarrow \frac{x^3(x+2) + 1(x-1)}{(x-1)(x+2)} = 0$$

$$R = \{-2, -1, 0, 1\}$$

سوال (2)

$$\left(\left(\frac{1}{x}\right)^2 - 9\right)(3x - e^x) > 0$$

(1)

$$\left(\frac{1}{x}\right)^2 = 9 = 3^2 = \left(\frac{1}{x}\right)^{-2} \Rightarrow x = -2$$

$$x^2 = 3^2 = 2^2 = (x^2)^{1/2} \rightarrow x = 2/4$$

$$-2 < x < 2/4$$

جدول تین علامت

دانه [2/4, ∞)

$$D_f = (-\infty, -2] \cup [2/4, +\infty)$$



Senshar

هری بقصرد

$$f(x) = \begin{cases} 3x-2 & x \geq 1 \\ 2x+3 & x < 1 \end{cases} \quad (8)$$

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

حالت 1 $\leftarrow x \geq 1$

$$f(x) - x \geq 0 \rightarrow 3x - 2 - x \geq 0 \rightarrow 2x \geq 2 \rightarrow x \geq 1$$

$$f(x) - x \geq 0 \rightarrow 2x + 3 - x \geq 0 \rightarrow x \geq -3 \quad \text{حالت 2} \leftarrow x < 1$$

بازه $-3 \leq x < 1$

دامنه g : $[-3, \infty)$

$$\sin \frac{\pi}{4} = \frac{\sqrt{3}}{2}, \cos 2\pi = 1 \quad (9)$$

$$\text{ورد} \rightarrow \sqrt{\frac{3}{4}} + 1$$

$$f\left(\frac{\sqrt{3}}{2} + 1\right) = 2\left(\frac{\sqrt{3}}{2} + 1\right)^2 - 4\left(\frac{\sqrt{3}}{2} + 1\right) =$$

$$2\left(\frac{3}{4} + \sqrt{3} + 1\right) - 2\sqrt{3} - 4 = \frac{3}{2} + 2\sqrt{3} + 2 - 2\sqrt{3} - 4 =$$

$-1/2$ ✓

✓



Senobar

هر یک از موارد

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

این مقدار برای تمام مقادیر a در دامنه S تابع به جز $a=1$ قرار می‌گیرد

$$a \neq 1 \quad \checkmark \quad \text{D}$$

$$f(g(a)) = (g(a))^2 - fg(a) = -f \quad (A)$$

$$g(a)^2 - fg(a) + f = 0 \rightarrow g(a) = 2$$

$$\sqrt{a^2 - 1} = 2 \rightarrow a^2 - 1 = 4 \rightarrow a^2 = 5 \rightarrow a = \pm \sqrt{5}$$

$$f(2) = \frac{1-a}{-1} + 9 = 2 \quad (A)$$

$$f(-2) = \frac{1-a}{-1} + 9 = 2 \quad \checkmark$$

$$1 \neq 2 \quad \text{D}$$

مدرسة الفجر

$$r \cos^2 x + a \cos x = \frac{1}{a}$$

(10)

$$r \left(\frac{1}{r}\right)^2 + a \left(\frac{1}{r}\right) = \frac{1}{a}$$

$$r \left(\frac{1}{r}\right) + \frac{a}{r} = \frac{1}{a}$$

$$\cos 40^\circ = \frac{1}{2}$$

$$\tan^2 x \rightarrow \tan^2 40^\circ = (\sqrt{3})^2 = 3$$

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

$$\frac{+}{-} \frac{-}{+} \frac{+}{-} \rightarrow Df = (-\infty, 0) \cup \left[\frac{1}{2}, 1\right)$$

$$(2) \left(\left(\frac{1}{x}\right)^n - 9\right)(x^2 - x^n) \geq 0 \rightarrow \frac{-2}{+} \frac{-10}{-} \rightarrow Df = (-\infty, -2] \cup \left[\frac{9}{2}, +\infty\right)$$

$$\left(\frac{1}{x}\right)^n = 9 \rightarrow x = -\frac{2}{9} \quad x^2 = x^n \rightarrow x = \frac{9}{2}$$

$$(3) \sqrt{x-1} + \sqrt{y+1} = 3, \quad \sqrt{y+1} = \frac{3 - \sqrt{x-1}}{1} \rightarrow 3 - \sqrt{x-1} \geq 0 \rightarrow \sqrt{x-1} \leq 3 \rightarrow x \leq 10$$

$$x-1 \geq 0 \rightarrow x \geq 1$$

$$I, II \rightarrow 1 \leq x \leq 10 \rightarrow Df = [1, 10]$$