

الف) $f(x) = \sqrt{x|x|} \rightarrow D_f = [0, +\infty)$
 $g(x) = x \rightarrow D_g = \mathbb{R}$

دامنه برابر ندارند - برابر نیستند

ب) $f(x) = \frac{(x^2+1)(x+1)+x+1}{x^2+\Delta x+1} = \frac{x^2+\Delta x+1+x+1}{x^2+\Delta x+1} = 1$ برابر هستند
 $g(x) = 1$

ج) $f(x) = \frac{2 \sin x - 3 \sin x}{2 \sin x - 3} = \frac{2 \sin x (2 \sin x - 3)}{2 \sin x - 3} = 2 \sin x$ برابر هستند
 $g(x) = 2 \sin x$

د) $f(x) = \frac{x}{|x|} \xrightarrow{\begin{smallmatrix} + \rightarrow 1 \\ - \rightarrow -1 \\ 0 \rightarrow 0 \end{smallmatrix}}$ برابر هستند
 $g(x) = \frac{|x|}{x} \xrightarrow{\begin{smallmatrix} + \rightarrow 1 \\ - \rightarrow -1 \\ 0 \rightarrow 0 \end{smallmatrix}}$

الف) $f(x) = \left[\frac{x^2}{x^2+1} \right] \rightarrow D_f = \mathbb{R}$ $\left[\frac{x^2}{x^2+1} \right] \rightarrow \left[\frac{x^2+1-1}{x^2+1} \right] = \left[1 - \frac{1}{x^2+1} \right] = [1^-] = 0$ ۲
 $g(x) = [x - [x]] \rightarrow D_g = \mathbb{R}$ همواره برابر میزن

ب) $f(x) = \frac{1}{[2x]} \rightarrow [2x] \neq 0 \rightarrow 0 < 2x < 1 \rightarrow 0 < x < \frac{1}{2}$ $D_f = \mathbb{R} - [0, \frac{1}{2})$ دامنه برابر ندارند - برابر نیستند
 $g(x) = \frac{1}{2[x]} \rightarrow [x] \neq 0 \rightarrow 0 < x < 1$ $D_g = \mathbb{R} - [0, 1)$

ج) $f(x) = \frac{1}{\sqrt{x-|x|}} \rightarrow x-|x| > 0 \rightarrow x > |x|$ $D_f = \emptyset$ دامنه برابر ندارند - برابر نیستند
 $g(x) = \frac{1}{\sqrt{|x|-x}} \rightarrow |x|-x > 0 \rightarrow |x| > x$ $D_g = \mathbb{R}^- \cup (-\infty, 0)$

د) $f(x) = \begin{cases} \frac{x^3-x}{x-1} & ; x \neq 1 \\ 2 & ; x = 1 \end{cases}$ برابر هستند
 $\frac{x^3-x}{x-1} = x^2+x \rightarrow \frac{x(x-1)(x+1)}{x-1} = x^2+x$
 $g(x) = x^2+x$ if $x=1 \rightarrow \begin{cases} f(1)=2 \\ g(1)=2 \end{cases}$

$$f(x) - g(x) = x^2 - x + 1$$

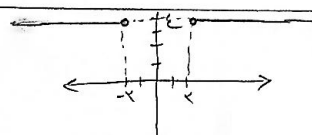
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$$+ f(x) + g(x) = x^2 + x + 1$$

$$\sqrt{f(x)} = \sqrt{x^2 + 1} \longrightarrow \boxed{f(x) = x^2 + 1} \xrightarrow{\text{دقيق}} \boxed{g(x) = x}$$

$$f'(x) - g'(x) = \left(f(x) - g(x) \right) \times \left(f(x) + g(x) \right) \longrightarrow \boxed{x^2 + x + 1}$$

$$f(x) = x - \sqrt{x^2 - \varepsilon} \quad , \quad g(x) = x + \sqrt{x^2 - \varepsilon}$$



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$$f \times g = (x - \sqrt{x^2 - \varepsilon})(x + \sqrt{x^2 - \varepsilon}) \longrightarrow x^2 - (x^2 - \varepsilon) = \varepsilon \quad D_f = D_g = (-\infty, -\sqrt{\varepsilon}] \cup [\sqrt{\varepsilon}, +\infty)$$

$$f(x) = \frac{ax + \gamma}{x^2 - mx + n} \quad , \quad g(x) = \frac{x - b}{x^2 - \gamma x - \delta} \xrightarrow{a+c=b} x \neq -1, x \neq \gamma, \delta$$

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if $x \neq -1$
 $x \neq \gamma, \delta$

$$(x+1)(x-\gamma, \delta) = x^2 - \gamma, \delta x - \gamma, \delta \longrightarrow m = \gamma, \delta \quad , \quad n = -\gamma, \delta$$

$$ax + \gamma = \frac{x - b}{x} \longrightarrow ax + \gamma = \frac{x}{x} - \frac{b}{x} \begin{cases} a = \frac{1}{x} \\ b = -\varepsilon \end{cases}$$

$$am - bn = \left(\frac{1}{x} \right)(\gamma, \delta) - (-\varepsilon)(-\gamma, \delta) = -\gamma, \delta$$

$$f(x) = \frac{bx + \gamma}{\lambda x + b} \quad , \quad g(x) = c \quad D_g = \mathbb{R} - \{a\}$$

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$$a = -\frac{b}{\lambda} \longrightarrow b = -\lambda a = \begin{cases} -\varepsilon \\ \varepsilon \end{cases}$$

$$D_f = \mathbb{R} - \left\{ \frac{-b}{\lambda} \right\}$$

$$\frac{-\lambda a x + \gamma}{\lambda x - \lambda a} = c \quad \text{if } x=0 \longrightarrow \frac{\gamma}{-\lambda a} = c \longrightarrow -\frac{1}{\varepsilon a} = c = \begin{cases} -\frac{1}{\gamma} \\ \frac{1}{\gamma} \end{cases}$$

$$x=1 \longrightarrow \frac{-\lambda a + \gamma}{\lambda - \lambda a} = \frac{-1}{\varepsilon a} = c \longrightarrow -\lambda + \lambda a = -\gamma \gamma a + \lambda a \longrightarrow a^2 = \frac{1}{\varepsilon} \longrightarrow a = \begin{cases} \frac{1}{\gamma} \\ -\frac{1}{\gamma} \end{cases}$$

$$\frac{ab}{c} = \pm \varepsilon$$

$$\sqrt{f-1} = \{(-1, \gamma), (\gamma, \gamma), (\gamma, -\delta), (0, 0)\} \quad , \quad g = \{(\gamma, \varepsilon), (\gamma, \gamma), (-1, -\varepsilon), (\delta, 0)\}$$

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$$+ \sqrt{f} = \{(-1, \gamma), (\gamma, \varepsilon), (\gamma, -\gamma), (0, \frac{1}{\gamma})\}$$

$$\sqrt{g} \begin{cases} x = -1 \longrightarrow \frac{-\lambda}{-\gamma} = \varepsilon \\ x = \gamma \longrightarrow \frac{\lambda}{\lambda} = 1 \\ x = \gamma \longrightarrow \frac{\gamma}{\varepsilon} = \gamma \end{cases}$$

$$\mathbb{R} \longrightarrow \varepsilon, 1, \gamma$$

$$f = \{(x, a), (-x, 3a - 2b), (c, d), (x, d)\}, \quad g = \{(x, -1), (-x, 1), (a - 2b, d)\} \quad -1$$

$$a = d = -1 \quad 1 = \frac{-2}{3a - 2b} \rightarrow b = -2 \quad \frac{a - 2b}{-1} = c = d \quad d + c \rightarrow -1 + d = \varepsilon$$

$$f(x) = \sqrt{-x^2 + x - m}, \quad g(x) = \{(a, b)\} \quad -9$$

$$f(x) = g(x) \text{ چون } \rightarrow f(a) = \sqrt{-a^2 + a - m} = b \quad \text{ریشه} \quad a + b = a + \sqrt{-a^2 + a - m}$$

$$\Delta = 0 \leftarrow \text{دقتی فقط یک جواب (ریشه تکراری) بجای ایم داشته باشه باید}$$

$$\Delta = b^2 - 4ac \rightarrow 1 - 4(-1)(-m) = 0 \rightarrow m = \frac{1}{4}$$

$$\Delta = 0 \text{ در نظر گرفته} \rightarrow \text{معادله فقط یک ریشه دارد} \rightarrow a = \frac{1}{4}$$

$$a = \frac{1}{4} \rightarrow b = f\left(\frac{1}{4}\right) = \sqrt{-\left(\frac{1}{4}\right)^2 + \frac{1}{4} - \frac{1}{4}} = 0$$

$$a + b \Rightarrow \frac{1}{4} + 0 = \frac{1}{4}$$

$$f(x) = \frac{2x + a}{x^2 + 4x + b}, \quad g(x) = \frac{2}{x - c} \quad -10$$

$$\text{if } x=0 \rightarrow \frac{2}{-c} = \frac{a}{b} \Rightarrow 2b = -ca$$

$$\frac{2}{x - c} = \frac{2(x + \frac{a}{2})}{(x - c)(x + \frac{a}{2})} \Rightarrow \frac{a}{2} - c = 4 \Rightarrow a - 2c = 12$$

$$D_f = D_g \rightarrow \mathbb{R} - \{c, -\frac{a}{2}\} = \mathbb{R} - \{c\} \rightarrow c = -\frac{a}{2} \Rightarrow a = -2c$$

$$-2c - 2c = 12 \rightarrow c = -3$$

$$a = 4$$

$$b = 9$$

$$a + b + c = 12$$