

عطار روضه پنجه
سینا قراچانی

۲۰

الف) $f(x) = \sqrt{x|x|} \rightarrow x|x| \geq 0 \rightarrow \begin{matrix} \oplus \checkmark \\ \ominus \checkmark \\ \odot \times \end{matrix} \rightarrow D_f = \mathbb{R}^+ \cup \{0\}$ مساوی نیست

$g(x) = x \rightarrow D_g = \mathbb{R}$

ب) $f(x) = \frac{(x+3)(x+4) + x+4}{x^2 + 2x + 1}$ مساوی

$g(x) = 1$ ~~فاقد ریشه حقیقی~~ $\Delta < 0$

ج) $f(x) = \frac{x \sin^2 x - 4 \sin x}{x \sin x - 3} \rightarrow \frac{x \sin x (x \sin x - 4 \sin x)}{x \sin x - 3} = x \sin x$ مساوی

$g(x) = x \sin x \rightarrow D_{f,g} = \mathbb{R}$
 $\sin x \neq \frac{3}{x}$

د) $f(x) = \frac{x}{|x|}$ مساوی

$g(x) = \frac{|x|}{x} \rightarrow x \neq 0 \rightarrow D_{f,g} = \mathbb{R} - \{0\}$

الف) $f(x) = \left\lfloor \frac{x^2}{x^2+1} \right\rfloor, g(x) = [x - [x]]$ مساوی

$\rightarrow x^2+1 > x^2$
 $\Rightarrow 0 < \frac{x^2}{x^2+1} < 1$

$\rightarrow$ برای اعداد صحیح
 $\rightarrow$ برای اعداد اعشاری



ب) $f(x) = \frac{1}{[x]}$ مساوی نیست

$g(x) = \frac{1}{x[x]}$

$\rightarrow [x] \neq 0$

$\rightarrow x[x] \neq 0$

$x \neq 0 \rightarrow [x] \neq 0$
 $x[x] \neq 0$

$D_f = \mathbb{R} - \{0\}$

$D_g = \mathbb{R} - \{0\}$

ج) $|x - |x|| > 0 \rightarrow \begin{matrix} \oplus \times \\ \ominus \times \\ \odot \times \end{matrix} D_f = \emptyset$

$|x| - x > 0 \rightarrow \begin{matrix} \oplus \times \\ \ominus \checkmark \\ \odot \times \end{matrix}$

$\frac{x(x+1)(x-1)}{(x-1)}$

د) $f(x) = \begin{cases} \frac{x^3 - x}{x-1} & ; x \neq 1 \\ x & ; x = 1 \end{cases}$

$g(x) = x^2 + x \rightarrow x(x+1)$ مساوی است

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

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

$$2g(x) = 2x \rightarrow g(x) = x$$

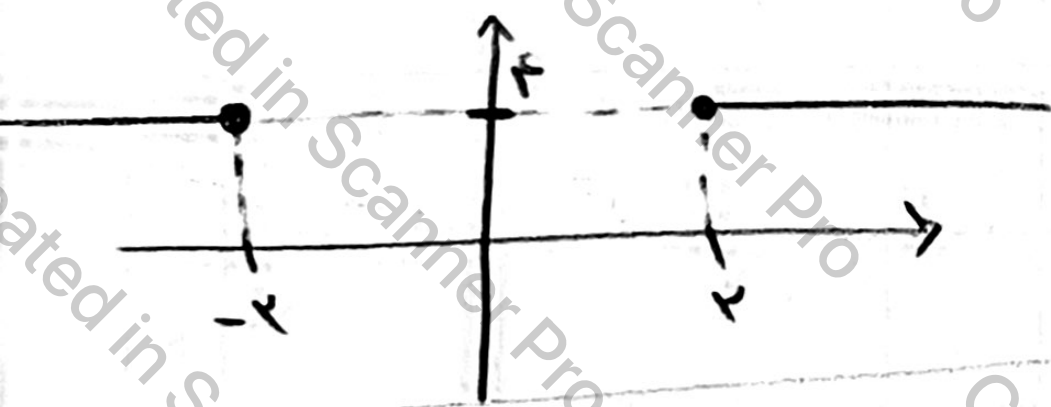
$$f(x) = x^2 + 1$$

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

$$f(x) = x - \sqrt{x^2 - 4} \rightarrow x^2 - 4 \geq 0 \rightarrow x^2 \geq 4 \rightarrow x \geq 2$$

$$g(x) = x + \sqrt{x^2 - 4} \rightarrow x \leq -2$$

$$f(x) \times g(x) = (x - \sqrt{x^2 - 4})(x + \sqrt{x^2 - 4}) = x^2 - (x^2 - 4) = 4$$



$$f(x) = \frac{ax + 1}{x^2 - mx + n}$$

$$g(x) = \frac{x - b}{x^2 - px - a}$$

$$x^2 - mx + n = x^2 - px - a$$

$$x^2 - mx + n = x^2 - \frac{p}{2}x - \frac{a}{2}$$

$$\rightarrow m = \frac{p}{2}, n = -\frac{a}{2}$$

$$ax + 1 = x - b \xrightarrow{x=0} 1 = -b \xrightarrow{x=1} a = \frac{1}{2}$$

$$am - bn = \frac{1}{2} \times \frac{p}{2} - (-\frac{a}{2} \times -\frac{1}{2}) = \frac{-p/4}{1}$$

$$x^2 - px - a \neq 0$$

$$x^2 - px - 1 = 0$$

$$(x - a)(x + 1) \neq 0 \rightarrow x \neq a, -1$$

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

$$\rightarrow x^2 - \frac{p}{2}x - \frac{a}{2}$$

$$f(x) = \frac{bx + c}{ax + b}, g(x) = c$$

$$a = -5 \rightarrow b = -11a$$

$$\frac{a}{b} = \frac{1}{11}$$

$$\begin{aligned} \frac{-11a + c}{11a - 11a} &= \frac{-11a + c}{0} = \frac{-1}{0} = \frac{1}{0} \\ \frac{1}{0} &= \frac{1}{0} \\ \frac{1}{0} &= \frac{1}{0} \\ \frac{1}{0} &= \frac{1}{0} \end{aligned}$$

$$g = \{(1, 1), (2, 1), (-1, -1), (0, 0)\}$$

$$f = \{(1, 1), (2, 1), (-1, -1), (0, 0)\}$$

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$$f = \{(1, a), (-3, 3a - 4b), (c, w), (2, d)\}$$

$$g = \{(1, -1), (-3, 1), (a - 3b, w)\}$$

$$a = -1$$

$$3a - 4b = 1 \rightarrow -3 - 4b = 1 \rightarrow -4b = 4 \rightarrow b = -1$$

$$a - 3b = w \rightarrow -1 + 3 = w \rightarrow w = 2$$

$$d = a = -1$$

$$d = a = -1 + w = 1$$

$$f(x) = \sqrt{-x^2 + x - m} \rightarrow \Delta \leq 1 - 4m \leq 0 \rightarrow m \geq \frac{1}{4}$$

$$g(x) = \{(a, b)\}$$

$$\sqrt{-(x - \frac{1}{2})^2} \rightarrow x \leq \frac{1}{2}$$

$$\{(\frac{1}{2}, 0)\} \quad a + b \leq \frac{1}{2}$$

(A)

$$f(x) = \frac{x^2 + 9}{x^2 + 4x + 6}$$

$$g(x) = \frac{x}{x - c}$$

$$x \leq 0 \rightarrow \frac{x}{-c} \leq \frac{a}{b}$$

$$x b \leq -a c$$

$$c \leq -x$$

$$b \leq a$$

$$1 \geq \frac{a}{b}$$

$$a \leq b$$

$$\rightarrow a + 9 - x \leq \frac{1}{2}$$

(10)