

سوال (1)

الف) $f(n) = \sqrt{n|n|}$
 $\downarrow$
 $n|n| > 0$

$g(n) = n$

برابر است
 فقط برای $n > 0$
 $n = -2 \rightarrow -2$
 $n = -3 \rightarrow -9$

$D_f = \mathbb{R}^+$
 $D_g = \mathbb{R}$

برابر نیست ✓

ب) $f(n) = n^2 + 4n + 2 + n + 2 \rightarrow \frac{n^2 + 5n + 4}{n^2 + 5n + 4} = 1$
 $g(n) = 1$

$D_f = \mathbb{R}$
 $D_g = \mathbb{R}$

برابر هستند ✓

ج) $f(x) = \frac{r \sin x - r}{r \sin x - r} \rightarrow \frac{r \sin x (r \sin x - r)}{r \sin x - r} = r \sin x$

برابر هستند ✓

$g(n) = r \sin x$

$r \sin x - r \neq 0 \rightarrow \sin x \neq \frac{r}{r}$

د) $f(n) = \frac{n}{|n|}$, $g(n) = \frac{|n|}{n}$
 $D_f = \mathbb{R} - \{0\}$
 $D_g = \mathbb{R} - \{0\}$

برابرند ✓

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

سوال (2) ✓

برابرند ✓

ب) $D_f = D_g$ $f(n) \neq g(n)$ مثال نشان: $n = -2, 2 \rightarrow f(n) = -\frac{1}{2} \neq g(n) = \frac{1}{2}$

برابر نیستند ✓

ج) $f(n) = n - |n| > 0$ $g(n) = |n| - n > 0$
 $n > |n|$ $|n| > n$
 $D_f = \emptyset$ $D_g = \mathbb{R}^-$

$D_g \neq D_f$

برابر نیستند ✓

د) $f(n) = \frac{n^2 - n}{n - 1} \xrightarrow{n \neq 1} \frac{n(n-1)}{n-1} = n$

$f(n) = g(n) \rightarrow D_f = D_g$

برابر هستند ✓

$f(n) - g(n) = n^2 - n + 1 \rightarrow g(n) = n$
 $f(n) + g(n) = n^2 + n + 1$
 $2f(n) = 2n^2 + 2 \rightarrow f(n) = n^2 + 1$

سوال (3)

✓

$f'(n) - g'(n) = (n^2 + 1)' - n' \rightarrow n^2 + 1 + 2n^2 - n^2 = n^2 + n^2 + 1$

$$f(x) = x - \sqrt{x^2 - \varepsilon}$$

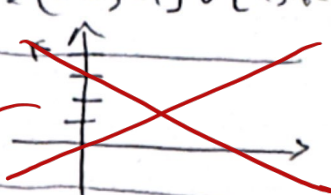
$$g(x) = x + \sqrt{x^2 - \varepsilon}$$

سوال ۴ (۱۵)

$$x^2 - \varepsilon \geq 0$$

$$x^2 \geq \varepsilon \rightarrow x \geq \sqrt{\varepsilon} \rightarrow D_f = (-\infty, -\sqrt{\varepsilon}] \cup [\sqrt{\varepsilon}, +\infty)$$

نمود
باید به تصویر دامنه کشید



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

$$\begin{cases} x \geq \sqrt{\varepsilon} \rightarrow \varepsilon \\ x \leq -\sqrt{\varepsilon} \rightarrow \varepsilon \end{cases}$$

سوال ۵

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

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

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

$$x-b = ax+2 \rightarrow -b = 2 \Rightarrow b = -2$$

$$ax = x \Rightarrow a = 1$$

$$-m = \frac{2}{-1} \rightarrow m = -\frac{2}{-1} = 2$$

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

۵/۱۵

$$\frac{ax-b}{x^2 - mx + n} = \frac{1}{x}$$

سوال ۶

۵

$$f = \{(-1, 2), (2, 4), (3, -2), (0, \frac{1}{2})\}$$

$$g = \{(2, 4), (3, 4), (-1, -4), (0, 0)\}$$

سوال ۷

۲

$$\frac{fg}{f+g} = \frac{(2, 8), (2, 12), (-1, -8), (0, 0)}{(2, 8), (3, 4), (-1, -2)}$$

$$\Rightarrow \{(2, 1), (-1, 4), (3, 3)\}$$

$$R = \{2, 1, 3\}$$

$$a = -1$$

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

$$-2b = 4 \rightarrow b = -2$$

سوال ۸

۲

$$(a, b) \rightarrow (-1, -2)$$

$$c = \frac{a-3b}{-1+4} \Rightarrow c = \frac{-1-3(-2)}{3} = \frac{5}{3}$$

$$d = -1$$

$$f(x) = \sqrt{-x^2 + ax - m} \Rightarrow \sqrt{-(x^2 - mx + m)}$$

$$\Delta = 0$$

$$\Delta = 1 - 4m$$

$$m = \frac{1}{4}$$

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

$$f(x^2 - x + \frac{1}{4}) \rightarrow -(x - \frac{1}{2})^2 \rightarrow x = \frac{1}{2}$$

$$b = 0$$

$$\begin{cases} a+b = \frac{1}{2} \\ \frac{1}{2} = \frac{1}{2} \end{cases}$$

سوال ۱۰

۲

$$2 \cdot \frac{r(a+\frac{a}{r})}{(a+\frac{a}{r})(a-c)} \rightarrow r + \frac{a}{c} - \frac{ac}{r} \rightarrow \frac{a}{r} - c = \frac{a}{r} - c$$

$$b = -\frac{ac}{r}$$

$$a+b+c > a - \frac{a(a-c)}{r} + \frac{a}{r} - c \Rightarrow a - \frac{a^2}{r} + \frac{ac}{r} - c + \frac{a}{r} - c \Rightarrow a - \frac{a^2}{r} + \frac{2ac}{r} - 2c$$