

(۱) برابر نیست $Dg = \mathbb{R} \Rightarrow Df \neq Dg$ و $Df = [0, +\infty) \Rightarrow x \geq 0 \Rightarrow |x| \geq 0 \Rightarrow |x| \geq 0$ (الف)

برابر است $Df = \mathbb{R} \xrightarrow{\text{برابرند و در نقطه انتخاب می‌کنیم}} Dg = \mathbb{R} \xrightarrow{\text{مخرج صفر نمی‌شود (دلتا متقی)}}$ (ب)

برابر است $f(x) = \frac{2 \sin x (2 \sin x - 3)}{2 \sin x - 3} \rightarrow fg = 2 \sin x$
 $2 \sin x - 3 \rightarrow 2 \sin x - 3 \neq 0 \rightarrow \sin x \neq \frac{3}{2}$
 چون $1 \leq \sin x \leq 1$ پس مخرج صفر نمی‌شود

$f(x) = g(x) \rightarrow Df = Dg$

برابر است $Df = \mathbb{R} - \{0\}$ و $Dg = \mathbb{R} - \{0\} \Rightarrow Df = Dg$ $\xrightarrow{\text{در نقطه انتخاب می‌کنیم و تساوی را بررسی می‌کنیم}}$ (د)

(۲) برابر است $f(x) = \left[\frac{x^2}{x^2+1} \right] = 0$ و $g(x) = [x[x]] = 0 \Rightarrow Df = Dg = \mathbb{R}$ (الف)

برابر نیست $[2x] \neq 0 \Rightarrow 0 \leq 2x < 1 \Rightarrow 0 \leq x < \frac{1}{2} \Rightarrow Df = \mathbb{R} - [0, \frac{1}{2})$ ؟
 $2[x] \neq 0 \Rightarrow [x] \neq 0 \Rightarrow 0 \leq x < 1 \Rightarrow Dg = \mathbb{R} - [0, 1) \Rightarrow Dg \neq Df$

(ج) $x - |x| > 0 \rightarrow x > |x| \rightarrow Df = \emptyset$ $|x| - x > 0 \rightarrow |x| > x$
 $|x| > x \rightarrow Dg = (-\infty, 0) \Rightarrow Dg \neq Df$ (برابر نیست)

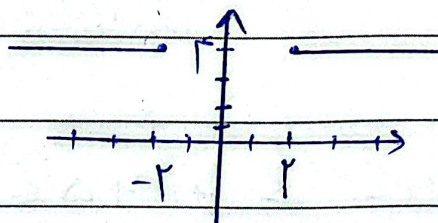
(د) $\frac{x(x^2-1)}{x-1} = \frac{x(x-1)(x+1)}{x-1} = x^2 + x$

$f(x) = \begin{cases} x^2 + x; & x \neq 1 \\ 2; & x = 1 \end{cases} \rightarrow Df = Dg$ (برابر است)

$$\begin{aligned} f(x) - g(x) &= x^r - x + 1 & f'(x) - g'(x) &= (x^r + 1)^r - x^r = 0 \\ f(x) + g(x) &= x^r + x + 1 & x^r + 1 + x^r - x &= x^r + x + 1 \\ \hline f(x) &= x^r + 1 \Rightarrow f(x) = x^r + 1, & g(x) &= x \end{aligned} \quad (10)$$

$$Df, Dg \Rightarrow x^r - 1 \geq 0 \Rightarrow x^r \geq 1 \Rightarrow x \geq 1, x \leq -1 \Rightarrow Df = Dg \quad (15)$$

$$Df \cap Dg = (-\infty, -1] \cup [1, +\infty)$$



$$f(x) = g(x) \Rightarrow \frac{x-b}{x^r - x - a} = \frac{ax+1}{x^r - mx + n} \Rightarrow (x^r - x - a)(ax+1) = (x^r - mx + n)(x-b) \quad (20)$$

$$x^r - mx + n \Rightarrow x^r - \frac{r}{r}x - \frac{a}{r} \rightarrow m = \frac{r}{r}, n = -\frac{a}{r}$$

$$\begin{aligned} (ax^r - x - a)(ax+1) &= (x^r - mx + n)(x-b) \\ \underline{ax = 1} \quad \underline{bx = -1} \quad \underline{am - bn} &\Rightarrow \left(\frac{1}{r} \cdot \frac{r}{r}\right) - \left(-\frac{1}{r} \cdot \frac{r}{r}\right) = \left(-\frac{r}{r}\right) \end{aligned}$$

$$Dg = Df \Rightarrow R - \left\{-\frac{b}{\lambda}\right\} \rightarrow a = -\frac{b}{\lambda} \quad g(m) = c \Rightarrow \frac{bm+1}{\lambda m+b} = c \quad (25)$$

$$\lambda cm + bc = bm + 1 \rightarrow \begin{cases} \lambda c = b \\ \lambda cb = 1 \end{cases} \rightarrow \lambda c^2 = 1 \rightarrow c = \pm \frac{1}{r}$$

$$\begin{aligned} c = \frac{1}{r} &\rightarrow b = r \rightarrow a = -\frac{r}{r} = -1 \rightarrow \frac{ab}{c} = -r \\ c = -\frac{1}{r} &\rightarrow b = -r \rightarrow a = \frac{r}{r} = 1 \rightarrow \frac{ab}{c} = r \end{aligned}$$

جواب

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

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

$$f \circ g \Rightarrow D_f = D_g \Rightarrow R_f = R_g$$

$$|a - 2b| \geq 1 \Rightarrow a = -1 \Rightarrow b = -2$$

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$$a, d = 1$$

$$a - 2b \leq 1 \Rightarrow (2, 5) \rightarrow d + (2) = -1 + 5 = 4$$

$$f(x) = \sqrt{-x^2 + x - m} \rightarrow -x^2 + x + m = 0 \rightarrow \Delta = 0 \text{ با } x \text{ محور را دارد}$$

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$$\begin{cases} b^2 - 4ac = 0 \\ 1 - 4m = 0 \end{cases} \Rightarrow m = \frac{1}{4} \Rightarrow -x^2 + x - \frac{1}{4} = 0$$

یک نقطه قطع کند.

$$x = \frac{-b \pm \sqrt{\Delta}}{2a} \Rightarrow \frac{-1}{-2} = \frac{1}{2}$$

$$\begin{cases} a = \frac{1}{4} \Rightarrow f(\frac{1}{4}) = 0 \\ b = 0 \end{cases} \Rightarrow a + b = \frac{1}{4} + 0 = \frac{1}{4}$$

$$x^2 + 9x + b = 0 \Rightarrow (x + 3)^2 \Rightarrow x = -3, (x - 3) \text{ منفرجه با يك رسته باشد}$$

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$$\Delta = b^2 - 4ac = 0, 36 - 4b = 0 \Rightarrow b = 9$$

با سه رسته

$$\frac{x+a}{x^2+9x+9} = \frac{1}{x+3} \Rightarrow x^2 + 12x + 11 = x^2 + 9x + ax + 3a \Rightarrow 9 + a = 12$$

$$a + b = 9 + 9 - 3 = 12 \quad a = 9$$