

سوال (۱)

الف) $f(x) = \sqrt{x|x|}$, $g(x) = x$

$$\left. \begin{aligned} D(f) &= x|x| \geq 0 \Rightarrow x \geq 0 \\ &\Rightarrow D(f) = [0, +\infty) \end{aligned} \right\} \Rightarrow f(x) \neq g(x)$$

$D(g) = \mathbb{R}$

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

$$D(f) = x^2+2x+1 \neq 0 \Rightarrow \Delta = 2^2 - 4 \times 1 \times 1 < 0 \Rightarrow D(f) = \mathbb{R}$$

$D(g) = \mathbb{R}$

$$\left. \begin{aligned} R(f) &= \frac{(x+1)(x+1)+x+1}{x^2+2x+1} = \frac{x^2+1x+1+x+1}{x^2+2x+1} = 1 \\ R(g) &= 1 \end{aligned} \right\} \Rightarrow f(x) = g(x)$$

ج) $f(x) = \frac{f \sin^2 x - 4 \sin x}{r \sin x - r}$, $g(x) = r \sin x$

$$\left. \begin{aligned} D(f) &= r \sin x - r \neq 0 \Rightarrow \sin x \neq \frac{r}{r} \\ D(g) &= \mathbb{R} \end{aligned} \right\} \Rightarrow D(f) \neq D(g)$$

$$\frac{f \sin^2 x - 4 \sin x}{r \sin x - r} = r \sin x$$

~~$f \sin^2 x - 4 \sin x \neq r \sin x$~~

$\Rightarrow f \sin^2 x - 4 \sin x =$

$f \sin^2 x - 4 \sin x$

$\Rightarrow R(f) = R(g) \Rightarrow$

$f(x) = g(x)$

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$$1) f(x) = \frac{x}{|x|}, \quad g(x) = \frac{|x|}{x}$$

$$\left. \begin{aligned} D(f) : |x| \neq 0 &\Rightarrow x \neq 0 \\ D(g) : x \neq 0 \end{aligned} \right\} \Rightarrow D(f) = D(g)$$

$$\begin{aligned} \text{if } f(x) &= g(x) \Rightarrow \frac{x}{|x|} = \frac{|x|}{x} \Rightarrow x^2 = |x|^2 \checkmark \\ R(f) &= R(g) \\ \Rightarrow f(x) &= g(x) \end{aligned}$$

سوال (۲)

$$\text{الف) } f(x) = \left[\frac{x^r}{x^{r+1}} \right] \text{ و } g(x) = [x - [x]]$$

$$\left. \begin{aligned} D(f) : x^{r+1} \neq 0 \quad \forall x \in \mathbb{R} &\Rightarrow D(f) = \mathbb{R} \\ D(g) &= \mathbb{R} \end{aligned} \right\} \Rightarrow D(f) = D(g)$$

$$\left[\frac{x^r}{x^{r+1}} \right] = \left[\frac{x^{r+1} - 1}{x^{r+1}} \right] = \left[1 - \frac{1}{x^{r+1}} \right] = 0 \quad \Rightarrow \left. \begin{aligned} f(x) &= g(x) \\ R(f) &= R(g) \end{aligned} \right\}$$

$$[x - [x]] = 0$$

$$\Rightarrow f(x) = g(x) = 0$$

$$\text{ب) } f(x) = \frac{1}{[rx]}, \quad g(x) = \frac{1}{r[x]}$$

$$\left. \begin{aligned} D(f) : [rx] \neq 0 &\Rightarrow \text{if } [rx] = 0 \Rightarrow 0 \leq rx < 1 \\ &\Rightarrow D(f) = \mathbb{R} - [0, \frac{1}{r}) \\ D(g) : r[x] \neq 0 &\Rightarrow \text{if } r[x] = 0 \Rightarrow [x] = 0 \Rightarrow 0 \leq x < 1 \\ &\Rightarrow D(g) = \mathbb{R} - [0, 1) \end{aligned} \right\} \Rightarrow$$

Subo

$$\Rightarrow D(f) \neq D(g) \Rightarrow$$

ادامہ قسمت سوال ۲

$$f(x) \neq g(x)$$

$$ج) f(x) = \frac{1}{\sqrt{x-|x|}} , g(x) = \frac{1}{\sqrt{|x|-x}}$$

$$D(f) : \sqrt{x-|x|} \neq 0 \Rightarrow x \neq |x| \Rightarrow x < 0 \Rightarrow x-|x| < 0 \Rightarrow \sqrt{x-|x|} \Rightarrow x-|x| > 0 \Rightarrow D(f) = \emptyset \Rightarrow f(x) = \emptyset$$

$$D(g) : \sqrt{|x|-x} \neq 0 \Rightarrow |x| \neq x \Rightarrow x < 0 \Rightarrow |x|-x > 0 \Rightarrow D(g) = (-\infty, 0)$$

$$D(f) \neq D(g) \Rightarrow f(x) \neq g(x)$$

$$د) f(x) = \begin{cases} \frac{x^r - x}{x-1} & x \neq 1 \\ r & x = 1 \end{cases} , g(x) = x^r + x$$

$$\text{if } x \neq 1 \Rightarrow \frac{x(x^r-1)}{x-1} = \frac{x(x+1)(x-1)}{(x-1)} = x^r + x \checkmark$$

$$\text{if } x = 1 \Rightarrow \frac{g(x)}{x-1} = x^r + x = 1 + 1 = 2 \checkmark$$

$$f(x) = g(x)$$

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

سوال ۳

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

$$r f(x) = r x^r + r \Rightarrow f(x) = x^r + 1$$

$$f(x) + g(x) = x^r + 1 + x^r + x = 2x^r + x + 1 \Rightarrow g(x) = x$$

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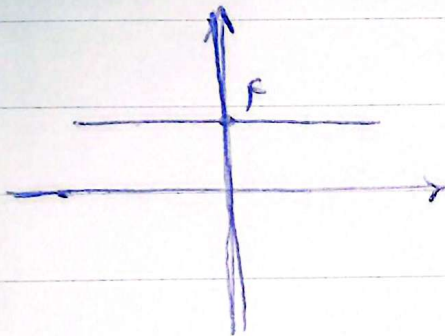
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$$P^r(x) \approx g^r(x) = (x^{r+1})^r - (x)^r = x^{r^2+r+1} + rx^{r^2} - x^r = \frac{x^{r^2+r+1} + rx^{r^2}}{1}$$

$$g(x) = x + \sqrt{x^{r^2}-f} \Rightarrow P \times g = P(x, r)$$

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

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



$$P(x) = \frac{ax+r}{x^r-mx+n}$$

$$g(x) = \frac{x-b}{rx^r-rx-d}$$

سوال (و)

$$am - bn = ?$$

$$D(g) = rx^r - rx - d \neq 0 \Rightarrow a+c=b$$

$$x \neq -1$$

$$x \neq \frac{d}{r}$$

$$x^r - mx + n = 0 \text{ آزمون } \Rightarrow (-1)^r - m(-1) + n = 0$$

$$\Rightarrow 1 + m + n = 0$$

$$\left(\frac{d}{r}\right)^r - m\left(\frac{d}{r}\right) + n = 0$$

$$\Rightarrow \frac{r^r d}{r^r} - \frac{d}{r} m + n = 0$$

$$\Rightarrow n = -m - 1$$

$$\Rightarrow -m - 1 = \frac{d}{r} m - \frac{r^r d}{r^r} \Rightarrow$$

$$n = \frac{d}{r} m - \frac{r^r d}{r^r}$$

$$\frac{r^r}{r^r} = \frac{r^r}{r^r} m$$

$$\Rightarrow m = \frac{r^r}{r^r}$$

$$\Rightarrow n = \frac{r^r}{r^r} - 1 = -\frac{d}{r}$$

$$\frac{ax+r}{x^r - \frac{r^r}{r^r} x - \frac{d}{r}} = \frac{x-b}{rx^r - rx - d}$$

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$$\Rightarrow b = r \Rightarrow a = \frac{1}{r}$$

$$am - bn = \frac{1}{r} \times \frac{r}{r} - \left(-\frac{r}{r}\right) \times \frac{-a}{r} = \frac{r}{r} - 1 = 0 = -9 \frac{1}{r} = \boxed{-\frac{9r}{r}}$$

$$f(x) = \frac{bx+r}{ax+b} \quad g(x) = C \quad D(g) = \mathbb{R} - \{a\} \quad \text{سوال ۶}$$

$$\frac{ab}{c} = ?$$

$$\frac{b}{a} = \frac{r}{b} \Rightarrow b^2 = ar \Rightarrow b = \pm r$$

if $b = r$ $\frac{rx+r}{ax+r} = \frac{1}{r} \Rightarrow C = \frac{1}{r} \quad a = \frac{r}{r} = 1$
 $\frac{1}{r} = \frac{rx+r}{r(ax+r)} \Rightarrow rx+r = ax+r \Rightarrow rx = ax \Rightarrow x = \frac{r}{a-r}$
 if $b = -r$ $\frac{-rx+r}{ax-r} = \frac{-1}{r} \Rightarrow C = -\frac{1}{r} \quad a = \frac{1}{r}$
 $\Rightarrow$ برای اینکه $rx+r=0 \Rightarrow x = -\frac{r}{r} = -1$
 $\Rightarrow$ برای اینکه $rx-r=0 \Rightarrow x = \frac{r}{r} = 1$

$$\frac{ab}{c} \quad \text{if } b=r : \frac{-\frac{1}{r} \times r}{\frac{1}{r}} = -r = \frac{ab}{c}$$

$$\frac{ab}{c} \quad \text{if } b=-r : \frac{\frac{1}{r} \times -r}{-\frac{1}{r}} = r = \frac{ab}{c}$$

$$\phi = \{(0,0), (-r, r), (r, -r), (0,0), (r, r)\} \quad \text{سوال ۷}$$

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

$$r\phi = \{(-1, r), (r, r), (r, -r), (0,0)\}$$

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

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

$$g = \{(2, 1), (3, 12), (-1, -1), (0, 0)\}$$

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

$$\frac{g}{P+g} = \{(-1, 4), (2, 1), (3, 4)\} \quad R_{\left(\frac{g}{P+g}\right)} = \{4, 1, 4\}$$

$$g = \{(2, 1), (-2, 1), (a-2b, d)\} \quad P = \{(2, a), (-3, 2a-2b), (1, c)\} \quad \text{سوال 18}$$

$$d+c = ?$$

$$a = -1 \quad 2a - 2b = 1 \Rightarrow 2(-1) - 2b = 1 \Rightarrow b = -\frac{3}{2}$$

$$d = -1 \quad c = a - 2b = -1 - 2(-\frac{3}{2}) = 2$$

$$\Rightarrow d+c = -1+2=1$$

$$P(x) = \sqrt{-x^2 + x + m}$$

سوال 19

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

$$a+b = ?$$

$$\sqrt{-(x^2 - x + m)}$$

$$x^2 - x + m = 0 \quad (*)$$

نمی توانیم حساب به ازای مقدارهای مختلف x (a, b) داشته باشیم

لایه های مختلف را در نظر

$$x^2 - x + m = 0$$

تفاوت یک $\Delta = 0$ x جواب معادله باشد

$$\Delta = 1 - 4m = 0 \Rightarrow m = \frac{1}{4}$$

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

$$x^r - x + m \frac{1}{r} = 0 \Rightarrow x = \frac{1 \pm \sqrt{\Delta}}{r} = \frac{1}{r}$$

$$\Rightarrow \frac{f(x)}{g(x)} = 0$$

$$\Rightarrow g(x) = \left\{ \left(\frac{1}{r}, 0 \right) \right\} \Rightarrow a + b = \frac{1}{r} + 0 = \frac{1}{r}$$

$$P(x) = \frac{rx+a}{x^r+4x+b}$$

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

(سوال 10)

$$a+b+c = ?$$

$$\frac{r(x + \frac{a}{r})}{(x + \frac{a}{r})(x-c)} = \frac{r(x + \frac{a}{r})}{(x + \frac{a}{r})^r} = \frac{rx+a}{x^r+4x+b}$$

$$\Rightarrow rx^r + \frac{a^r}{r} + ax = x^r + 4x + b \Rightarrow$$

$$a=4$$

$$\frac{a^r}{r} = \frac{r^2}{r} = 4 = b$$

$$x-c = x + \frac{a}{r} \Rightarrow r = -c \Rightarrow$$

$$c = -r$$

$$\Rightarrow a+b+c = 4+4-r = 1r$$

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