بنام خدا

19/5

بهنیا منصوریان

پاسخنامه تشریحی تکلیف شماره ۳ کلاس دهم پسر A

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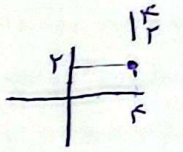
الف) $y^3 - x = 2x^2 \Rightarrow y^3 = 2x^2 + x$ تعریف ریاضی $\begin{cases} y_1^3 = 2x^2 + x \\ y_2^3 = 2x^2 + x \end{cases} \rightarrow y_1^3 = y_2^3 \rightarrow y_1 = y_2$ ✓ تابع است

ب) $|y| = -x^2 + x + 3$ مثال نقض $\rightarrow x = 1 \quad y = \pm 3 \quad |3, |-3$ ✗ تابع نیست

$|y| + x^2 = x + 3$

ج) $\underbrace{\sqrt{x-4}}_{\text{نامنفی}} + \underbrace{|y-2|}_{\text{نامنفی}} = 0 \Rightarrow \sqrt{x-4} = 0 \;,\; |y-2| = 0 \rightsquigarrow x = 4 \checkmark \;,\; y = 2 \checkmark$



تابع است ✓

د) $x = \cos y \xrightarrow{\text{مثال نقض}} x = 0 \quad y = 2k\pi \pm \frac{\pi}{2} \quad |_{2k\pi + \frac{\pi}{2}} \quad |_{2k\pi - \frac{\pi}{2}}$ ✗ تابع نیست

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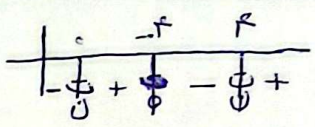
الف) $y = \frac{x+4}{x^2 - 4x} = \frac{x+4}{x(x-4)}$ ریشه‌ها: $\begin{cases} x+4 \rightarrow -4 \\ x-4 \rightarrow 4 \\ x \rightarrow 0 \end{cases}$

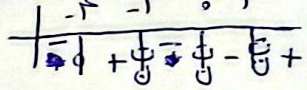


$D_f = \mathbb{R} - \{4, 0\}$

ب) $y = \frac{x+4}{x^2 - 7x + 14}$ $(-7)^2 - 4 \times 14 \times 1 = -15$ ریشه ندارد $\rightsquigarrow \Delta < 0$ $\Rightarrow D_f = \mathbb{R}$

ج) $y = \frac{x+4}{x^2 + x + 4} \rightarrow \Delta = (1)^2 - 16 = -15 < 0 \Rightarrow$ ریشه ندارد $\Rightarrow D_f = \mathbb{R}$

د) $y = \frac{x+4}{x^4 - 4x^2} = \frac{x+4}{x^2(x-2)(x+2)}$ ریشه صورت: -4 ریشه مخرج: $0, 2, -2$



$D_f = \mathbb{R} - \{2, 0, -2\}$

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الف) $y = \sqrt{4-x} + \sqrt{x-2}$ $4 - x \geq 0 \;,\; x - 2 \geq 0$ $4 \geq x \;,\; x \geq 2$ $D_f = [2, 4]$

ب) $y = \frac{x^3 + 1}{x^2 + 1} \Rightarrow x^2 + 1 \neq 0 \Rightarrow x^2 \neq -1$ x^2 همیشه مثبت $\Rightarrow D_f = \mathbb{R}$

ج) $y = \frac{\sqrt{x-2}}{x-4}$ $x - 4 \neq 0 \;,\; x - 2 \geq 0$ $x \neq 4 \;,\; x \geq 2$ $D_f = [2, 4) \cup (4, +\infty)$

د) $y = \frac{2x+3}{\underbrace{|x| + x^2}_{\text{نامنفی}}}$ $\left.\begin{matrix} |x| \neq 0 \\ x^2 \neq 0 \end{matrix}\right\} \Rightarrow x \neq 0 \Rightarrow D_f = \mathbb{R} - \{0\}$

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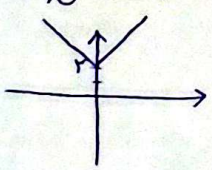
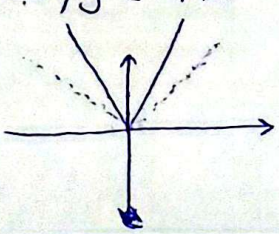
$y = |x|$

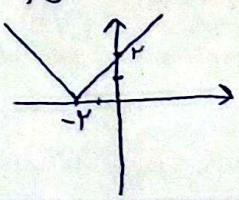
الف) $y = |x| + 2$



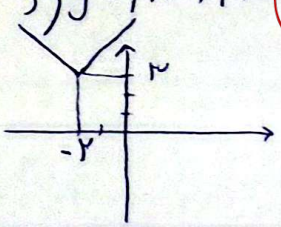
ب) $y = 2|x|$



ج) $y = |x + 2|$



د) $y = |x + 2| + 3$



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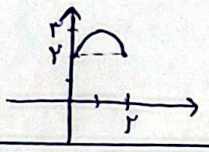
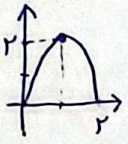
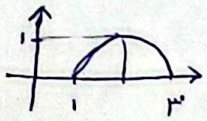
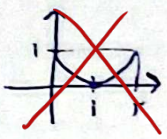
الف) $f(x)+2$ 

ب) $2f(x)$ 

ج) $f(x-1)$ 

د) $-f(x)$ 

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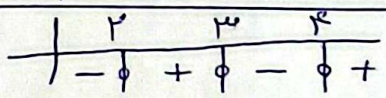
(۳)

الف) $y=(x-2)(x+2)(x-4)$



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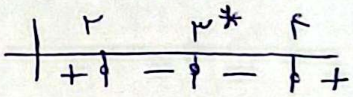
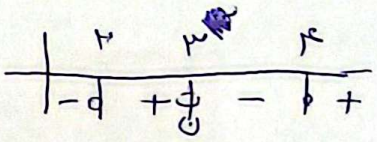
ب) $y=(x-2)(x-3)^2(x-4)$

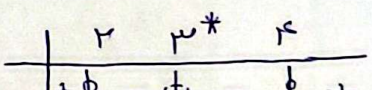


(۲)

الف) $y=\dfrac{(x-2)(x-4)}{(x-3)}$



ب) $y=\dfrac{(x-2)(x-4)}{(x-3)^2}$



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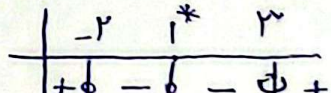
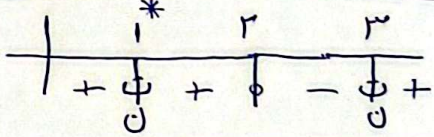
(۳)

الف) $\dfrac{x^3-3x+2}{x-3}$ ← جمع ضرایب = ۰ ⇒ توان فرد + جمع ضرایب = توان زوج

$\dfrac{(x-1)(x^2+x-2)}{x-3}=\dfrac{(x-1)(x-1)(x+2)}{(x-3)}$



ب) $\dfrac{x^2-3x+2}{x^2-4x+3}=\dfrac{(x-1)(x-2)}{(x-1)(x-3)}$



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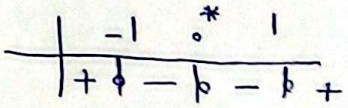
الف) $\dfrac{x^4-x^2}{x^2+x+2}=\dfrac{x^2(x-1)(x+1)}{x^2+x+2}$

x^2+x+2 ← $\Delta=1-8=-7<0$ ریشه ندارد



(۳)

ب) x^2+3x+3 ← $\Delta=9-12=-3<0$ ریشه ندارد

x^2+2x+3 ← $\Delta=4-12=-8<0$ ریشه ندارد

min دارد

min دارد

همیشه مثبت

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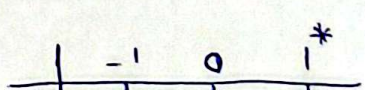
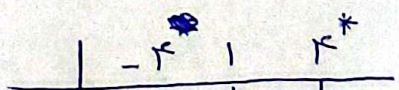
(۳)

الف) $y=\sqrt{\dfrac{x^3-1}{x^3-x}}=\sqrt{\dfrac{x^3-1}{x(x-1)(x+1)}}$



$D_f=(-\infty,-1)\cup(0,1)\cup(1,+\infty)$

ب) $y=\sqrt{\dfrac{x^2-14}{x^2-5x+4}}=\sqrt{\dfrac{(x+3)(x-4)}{(x-1)(x-4)}}$

$\Rightarrow$ 

$D_f=(-\infty,-3]\cup(1,4)\cup(4,+\infty)$