

۱۴/۵ آخرین!

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

ب) $|y| + x^2 = x + 2 \rightarrow \begin{cases} |y_1| = x + 2 - x^2 \\ |y_2| = x + 2 - x^2 \end{cases} \rightarrow |y_1| = |y_2| \rightarrow y_1 = \pm y_2$ تابع نیست ✓
 ج) $\sqrt{x-4} + |y-2| = 0 \rightarrow$ هیچکدام منفی نمی توانستند بنابراین هر دو باید صفر شوند $\rightarrow x=4, y=2$ نقطه $\rightarrow \{(4,2)\}$ تابع است ✓
 د) $x = \cos y$ if $x=0 \rightarrow$... باشد $\frac{3\pi}{4}, \frac{\pi}{4}$ می تواند متناهی $\rightarrow$ تابع نیست ✓

الف) $y = \frac{x+4}{x^2-4x} \rightarrow x^2-4x \neq 0 \rightarrow x \neq 0, 4$ $D_f = \mathbb{R} - \{4, 0\}$ ✓

ب) $y = \frac{x+4}{x^2-7x+12} \rightarrow x^2-7x+12 \neq 0 \rightarrow \Delta = b^2-4ac \Rightarrow 49-48=1 < 0 \rightarrow$ ریشه ندارد ✓ $D_f = \mathbb{R}$

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

د) $\frac{x+4}{x^2-4x^2} \rightarrow x^2-4x^2 \neq 0 \rightarrow x^2(x^2-4) \neq 0 \rightarrow x^2(x-2)(x+2) \neq 0 \rightarrow \begin{cases} x \neq 0 \\ x \neq 2 \\ x \neq -2 \end{cases} D_f = \mathbb{R} - \{0, 2, -2\}$ ✓

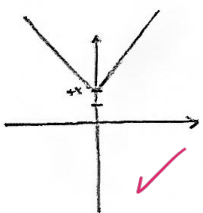
الف) $y = \sqrt{4-x} + \sqrt{x-2} \rightarrow \begin{cases} 4-x \geq 0 \rightarrow x \leq 4 \\ x-2 \geq 0 \rightarrow x \geq 2 \end{cases} \rightarrow 2 \leq x \leq 4 \rightarrow D_f = [2, 4]$ ✓

ب) $y = \frac{x^2+1}{x^2+1} \rightarrow x^2+1 \neq 0 \rightarrow x \neq \pm 1$ $D_f = \mathbb{R} - \{1, -1\}$ $D_f = \mathbb{R}$ ✓

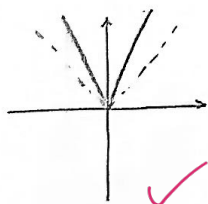
ج) $y = \frac{\sqrt{x-2}}{x-4} \rightarrow \begin{cases} x-2 \geq 0 \rightarrow x \geq 2 \\ x-4 \neq 0 \rightarrow x \neq 4 \end{cases} D_f = [2, +\infty) - \{4\}$ ✓

د) $y = \frac{x^2+2}{|x|+x^2} \rightarrow |x|+x^2 \neq 0 \rightarrow x \neq 0 \rightarrow D_f = \mathbb{R} - \{0\}$ ✓

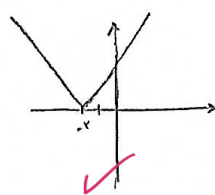
الف) $y = |x| + 2$



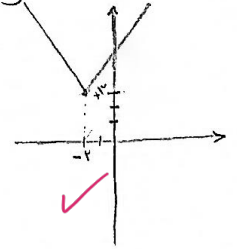
ب) $y = 2|x|$



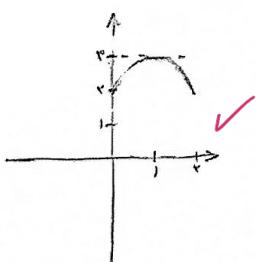
ج) $y = |x+2|$



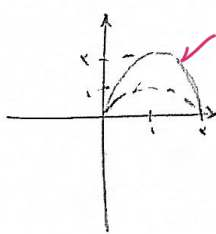
د) $y = |x+2| + 2$



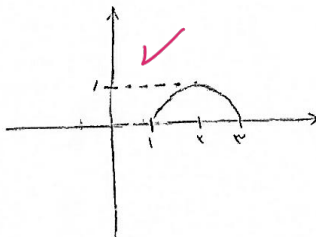
الف) $f(x) + 2$



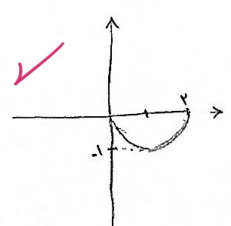
ب) $2f(x)$



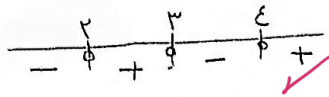
ج) $f(x-1)$



د) $-f(x)$



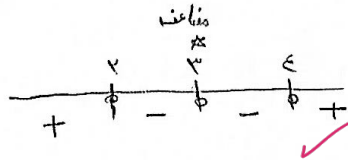
الف) $y = (x-2)(x-3)(x-4)$
 (2) (3) (4)



(2)

4

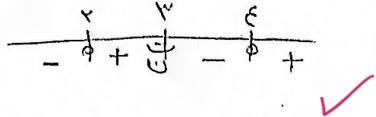
ب) $y = (x-2)(x-3)^2(x-4)$
 (2) (3) (4)



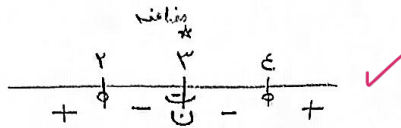
(2)

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الف) $y = \frac{(x-2)(x-4)}{x-3}$
 (2) (3) (4)



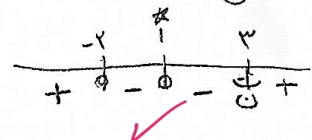
ب) $y = \frac{(x-2)(x-4)}{(x-3)^2}$
 (2) (3) (4)



الف) $y = \frac{x^3 - 3x^2 + 2x}{x-3}$

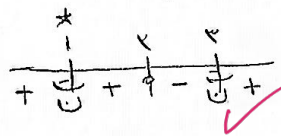
→ $x^2(x-3) + 2x \rightarrow x^3 - 3x^2 + 2x \div x-3$
 $\begin{array}{r} x^3 - 3x^2 + 2x \\ -(x^3 - 3x^2) \\ \hline 2x \end{array}$
 $\begin{array}{r} 2x \\ -(2x - 6) \\ \hline 6 \end{array}$

$\frac{(x-1)(x-1)(x+2)}{(x-3)}$
 (1) (1) (2) (3)



ب) $y = \frac{x^3 - 3x^2 + 2x}{x^2 - 4x + 3}$

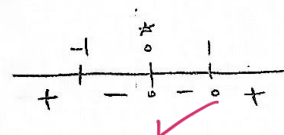
$\rightarrow \frac{(x-1)(x-2)}{(x-1)(x-3)}$
 (1) (2) (3)



(2)

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الف) $y = \frac{x^3 - x^2}{x^2 + x + 2}$ → $x^2(x-1) \rightarrow x^2(x-1)(x+1)$



→ $\Delta = b^2 - 4ac \rightarrow 1 - 4 = -3 < 0 \rightarrow$ ریشه ندارد

ب) $y = \frac{x^2 + 3x + 2}{x^2 + 2x + 3}$

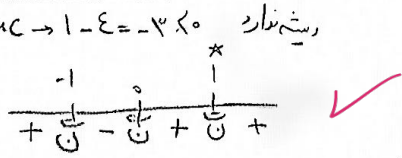
→ $\Delta = 9 - 12 = -3 < 0 \rightarrow$ ریشه ندارد
 → $\Delta = 4 - 12 = -8 < 0 \rightarrow$ ریشه ندارد

همیشه مثبت است

(2)

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الف) $y = \sqrt{\frac{x^2 - 1}{x^2 - x}}$ → $\frac{(x-1)(x+1)}{x(x-1)}$
 (1) (1) (2) (3)

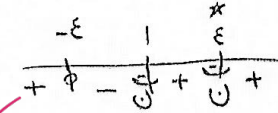


$D_f = (-\infty, -1) \cup (0, 1) \cup (1, +\infty)$

(2)

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ب) $y = \sqrt{\frac{x^2 - 14}{x^2 - 5x + 6}}$ → $\frac{x^2 - 14}{x^2 - 5x + 6} \rightarrow \frac{(x-4)(x+4)}{(x-1)(x-6)}$
 (4) (4) (1) (6)



$D_f = (-\infty, -4] \cup (1, 4) \cup (6, +\infty)$