

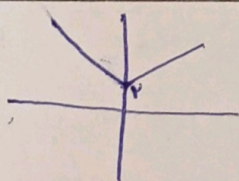
الف) $y^3 - x = 2x^2$ تابع ✓
 $y_1^3 = x + 2x^2$
 $y_2^3 = x + 2x^2$ } $y_1^3 = y_2^3 \Rightarrow y_1 = y_2$
 ب) $|y| + x^2 = x + 3$
 $x=0$
 $|y|=3 \Rightarrow y = \pm 3$ تابع ✗

ج) $\sqrt{x-4} + |y-2| = 0$ تابع ✓
 $y-2=0 \Rightarrow y=2$
 $\sqrt{x-4}=0 \Rightarrow x-4=0 \Rightarrow x=4$
 د) $x = \cos y$
 $\cos y = 0 \Rightarrow y = 90^\circ, 270^\circ$ تابع ✗

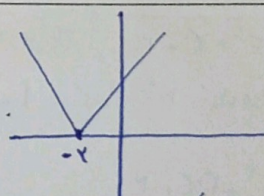
الف) $y = \frac{x+4}{x^2-4x}$ $x^2-4x \neq 0 \Rightarrow x(x-4) \neq 0 \Rightarrow x \neq 0, x \neq 4$ $D = \mathbb{R} - \{0, 4\}$
 ب) $y = \frac{x+4}{x^2-7x+14}$ $x^2-7x+14 \neq 0 \Rightarrow \Delta = b^2-4ac = 49-56 = -7 < 0$ $D = \mathbb{R}$
 ج) $y = \frac{x+4}{x^2+x+4}$ $\Delta = b^2-4ac = 1-16 = -15 < 0$ $D = \mathbb{R}$
 د) $y = \frac{x+4}{x^2-4x}$ $x^2-4x \neq 0 \Rightarrow x^2(x-4) \neq 0 \Rightarrow x \neq 0, x \neq 4$ $D = \mathbb{R} - \{0, 4\}$

الف) $y = \sqrt{4-x} + \sqrt{x-2}$
 $4-x \geq 0 \Rightarrow x \leq 4$
 $x-2 \geq 0 \Rightarrow x \geq 2$
 $D = [2, 4]$
 ج) $y = \frac{\sqrt{x-2}}{x-4}$ $x-2 \geq 0 \Rightarrow x \geq 2$
 $x-4 \neq 0 \Rightarrow x \neq 4$
 $D = [2, +\infty) - \{4\} = [2, 4) \cup (4, +\infty)$
 ب) $y = \frac{3x+1}{x^2+1}$ $D = \mathbb{R}$
 د) $y = \frac{2x+3}{|x|+x^2}$ $D = \mathbb{R} - \{0\}$

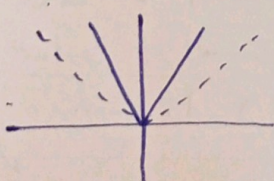
الف) $y = |x| + 2$



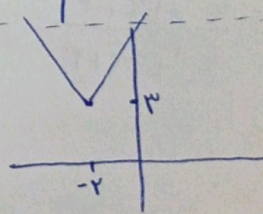
ج) $y = |x+2|$



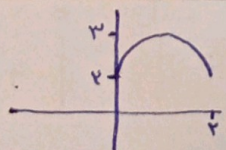
ب) $y = 2|x|$



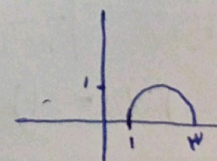
د) $y = |x+2| + 3$



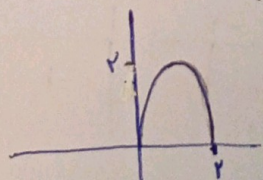
الف) $f(x) + 2$



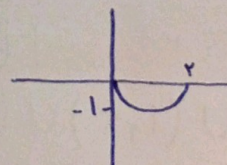
ج) $f(x-1)$



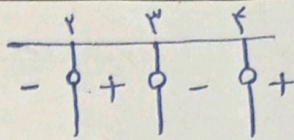
ب) $2f(x)$



د) $-f(x)$

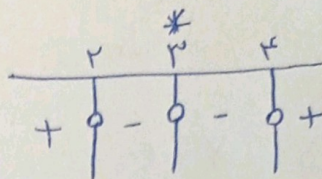


الف) $y = (x-2)(x-3)(x-4)$

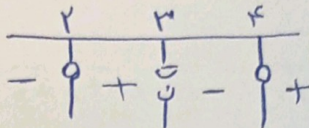


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ب) $y = (x-2)(x-3)^2(x-4)$

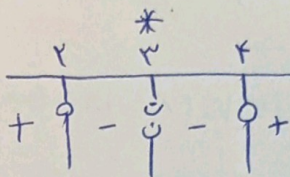


الف) $y = \frac{(x-2)(x-4)}{x-3}$

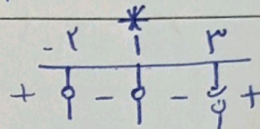


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ب) $y = \frac{(x-2)(x-4)}{(x-3)^2}$



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

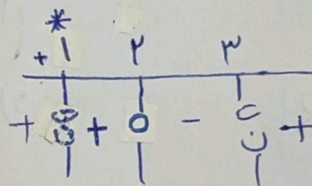


$a+b+c=0$

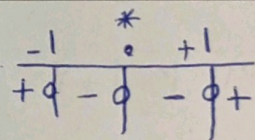
$1-3+2=0 \Rightarrow$ عبارت بر ۱ بخش است $(x^3 - 3x + 2) \div (x-1) = (x-1)(x+2)$

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



الف) $y = \frac{x^4 - x^2}{x^2 + x + 2} = \frac{x^2 - 1}{x^2 + x + 2} \cdot \frac{x^2(x-1)}{x^2 + x + 2} = \frac{x^2(x-1)(x+1)}{x^2 + x + 2} \Rightarrow$



$x^2 + x + 2 \Rightarrow \Delta = b^2 - 4ac = 1 - 8 = -7 < 0 \Rightarrow$ همواره مثبت

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

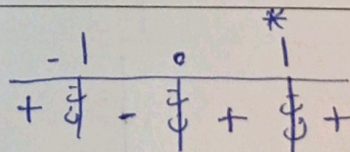
$x^3 + 3x + 4 \Rightarrow \Delta = b^2 - 4ac = 9 - 16 = -7 < 0 \Rightarrow$ همواره مثبت

عبارت همواره مثبت است

$x^2 + 2x + 3 \Rightarrow \Delta = b^2 - 4ac = 4 - 12 = -8 < 0 \Rightarrow$ همواره مثبت

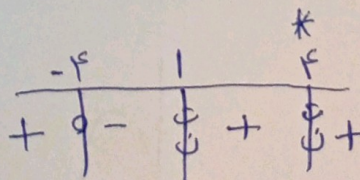
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الف) $y = \sqrt{\frac{x^3 - 1}{x^3 - x}} = \sqrt{\frac{(x-1)(x^2 + x + 1)}{x(x-1)(x+1)}} \Rightarrow$



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

ب) $\sqrt{\frac{x^2 - 16}{x^2 - 5x + 4}} = \sqrt{\frac{(x-4)(x+4)}{(x-4)(x-1)}} \Rightarrow$



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

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