نام و نام خانوادگی ....[illegible]........ پاسخنامه تشریحی تکلیف شماره ...۳... کلاس ....

۱

الف) $y_1^3 = 2x^2 + x \quad y_2^3 = 2x^2 + x \Rightarrow y_1^3 = y_2^3 \Rightarrow y_1 = y_2 \Rightarrow$ تابع است

ب) $|y| + x^2 = x + 4 \Rightarrow x = 0 \rightarrow |y| = 4 \Rightarrow y = \pm 4 \rightarrow$ تابع نیست

ج) $\sqrt{x-4} + |y-2| = 0 \Rightarrow x - 4 = 0 \Rightarrow x = 4,\ y - 2 = 0 \Rightarrow y = 2 \} \ [(4,2)] \rightarrow$ تابع

د) $x = \cos y \Rightarrow x = 0 \Rightarrow \cos y = 0 \Rightarrow y = \frac{\pi}{2}, \frac{3\pi}{2} \rightarrow$ تابع نیست

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الف) $\frac{x+4}{x^2-4x} = \frac{x+4}{x(x-4)} \Rightarrow D_f = \mathbb{R} - \{0, 4\}$

ب) $y = \frac{x+4}{x^2-7x+14} \Rightarrow D_f = \mathbb{R}$ ← $\Delta < 0$ هیچ‌گاه صفر نمی‌شه

ج) $y = \frac{x+4}{x^2+x+4} \Rightarrow D_f = \mathbb{R}$ ← $\Delta = 1 - 16 = -15$ هیچ‌گاه صفر نمی‌شه

د) $\frac{x+4}{x^4-4x^2} \Rightarrow \frac{x+4}{x^2(x^2-4)} = \frac{x+4}{x^2(x-4)(x+4)} \Rightarrow D_f = \mathbb{R} - \{0, 4, -4\}$

۳

الف) $y = \sqrt{6-x} + \sqrt{x-2} \Rightarrow 2 \le x \le 6 \Rightarrow D_f\ (2,6)$
$6 - x \ge 0,\ 6 \ge x$; $x - 2 \ge 0,\ x \ge 2$

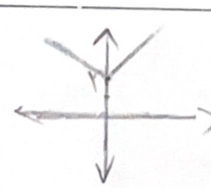
ب) $y = \frac{\sqrt[3]{x+1}}{x^2+1} \Rightarrow x^2 + 1 > 0 \Rightarrow D_f = \mathbb{R}$ ← در هیچ حالت صفر نمی‌شود

ج) $\frac{\sqrt{x-2}}{x-4} \Rightarrow x - 2 \ge 0 \Rightarrow x \ge 2,\ x - 4 \ne 0 \Rightarrow x \ne 4 \} \ (2, +\infty) - \{4\}$

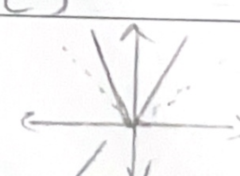
د) $\frac{2x+3}{|x|+x^2} \Rightarrow |x| + x^2 \ne 0 \Rightarrow x \ne 0 \Rightarrow D_f = \mathbb{R} - \{0\}$

۴

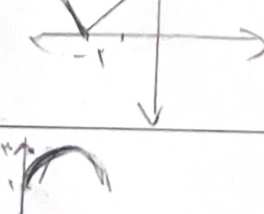
الف) $y = |x| + 2 \Rightarrow$



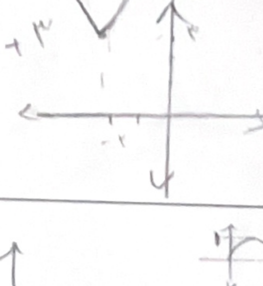
ب) $y = 2|x|$



ج) $y = |x+2| \Rightarrow$



د) $y = |x+2| + 3$



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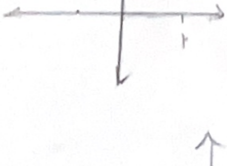
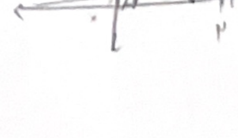
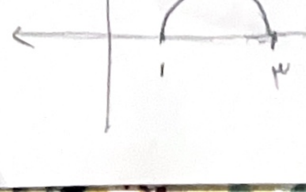
الف) $f(x) + 2$



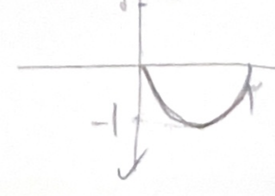
ب) $2f(x)$



ج) $f(x-1)$

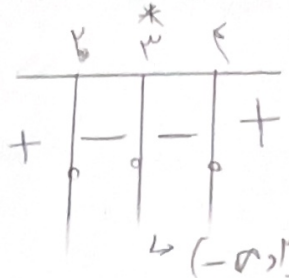


د) $-f(x)$



۶

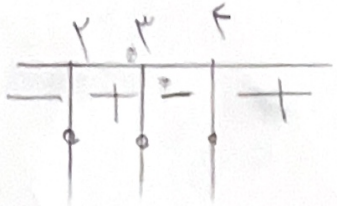
ب) $(x-1)(x-2)^2(x-4)$



$(-\infty,2]\cup[4,+\infty) > 0$

$[2,4] < 0$

الف) $(2x-1)(x-2)(x-4)$



$(-\infty,2]\cup[3,4] < 0$

$[2,3]\cup[4,+\infty) > 0$

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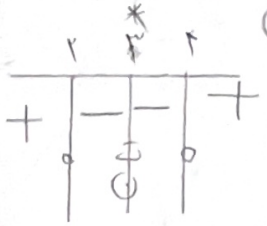
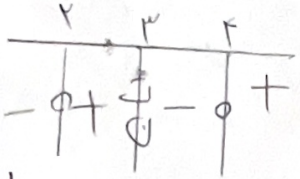
ب) $\dfrac{(x-2)(x-4)}{(x-3)^2}$



$(-\infty,2]\cup[4,+\infty) > 0$

$(2,4] < 0$

الف) $y = \dfrac{(x-2)(x-4)}{x-3}$



$[2,3)\cup[4,+\infty) > 0$

$(-\infty,2]\cup(3,4] < 0$

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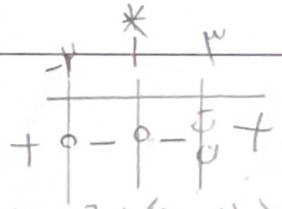
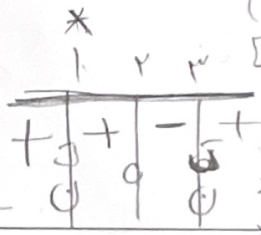
الف) $\dfrac{x^3-3x+2}{x-3} = \dfrac{(x-1)(x^2+x-2)}{x-3} = \dfrac{(x-1)(x-1)(x+2)}{x-3}$



$(-\infty,-2]\cup(1,3) > 0$

$[-2,3) < 0$

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

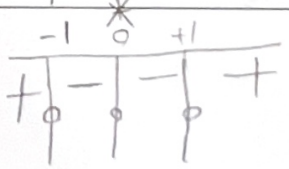


$(-\infty,1)\cup(3,+\infty) > 0$

$[1,2)\cup[2,3) < 0$

۹

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



$(-\infty,-1]\cup[1,+\infty) \geq 0$

$[-1,+1] \leq 0$

$\Delta = -3 < 0$ ← همواره مثبت

ب) $y = \dfrac{x^2+2x+2}{x^2+2x+2} = 1$ ← همواره مثبت $\Delta = -4 < 0$

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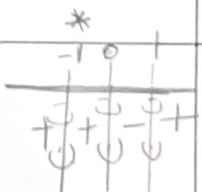
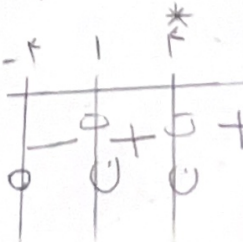
الف) $y = \sqrt{\dfrac{x^3-1}{x^2-x}} = \sqrt{\dfrac{(x-1)(x^2+x+1)}{x(x-1)(x+1)}}$



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

ب) $\sqrt{\dfrac{x^2-16}{x^2-5x+6}} = \sqrt{\dfrac{(x-4)(x+4)}{(x-2)(x-3)}}$



$D_f = (-\infty,-4]\cup(2,3)\cup[4,+\infty)$