تکلیف شماره 3	کیمیا مرادی

1-

الف) $y^3 - x = 2x^2 \to y^3 = 2x^2 + x \to y^3 = x(2x+1) \to \begin{cases} y_1^3 = x(2x+1) \\ y_2^3 = x(2x+1) \end{cases}$ تابع هست

$y_1^3 = y_2^3 \Rightarrow x(2x+1) = x(2x+1)$

ب) $|y| + x^2 = x + 3 \to |y| = x - x^2 + 3$

$\left.\begin{array}{l} |y_1| = x - x^2 + 3 \\ |y_2| = x - x^2 + 3 \end{array}\right] \to |y_1| = |y_2| \to y_1 = \pm y_2$ تابع نیست

ج) $\sqrt{x-4} + |y-2| = 0 \to -\sqrt{x-4} = |y-2|$

$x \geq 4 \qquad x=4 \qquad 0 = 0 = |y-2| \qquad y=2$

تابع است $\quad (4, 2)$

د) $x = \cos y \to \frac{\pi}{2}, \frac{3\pi}{2}, \dots$ تابع نیست

$x = 0$

2-

الف) $y = \frac{x+4}{x^2-4x} \to x^2 - 4x \to x(x-4)=0 \to x=0 \,/\, x=4$

$D_f = \mathbb{R} - \{0, 4\} \,/\, (-\infty, 0) \cup (0, 4) \cup (4, +\infty)$

ب) $y = \frac{x+4}{x^2-7x+19} \to \Delta = 49 - 76 \to \Delta < 0 \to$ ریشه ندارد

$D_f = \mathbb{R} \,/\, (-\infty, +\infty)$

ج) $y = \frac{x+4}{x^2+x+4} \to \Delta = 1 - 16 \to \Delta < 0 \to$ ریشه ندارد

$D_f = \mathbb{R} \,/\, (-\infty, +\infty)$

د) $y = \frac{x+4}{x^4-4x^2} \to x^2(x^2-4)=0 \to x=0 \,/\, x=\pm 2$

$D_f = (-\infty, -2) \cup (-2, 0) \cup (0, 2) \cup (+2, +\infty)$

3-

الف) $y = \sqrt{9-x} + \sqrt{x-2}$

$x \leq 9 \cup x \geq 2 \to (-\infty, +2] \cup [9, +\infty)$

ب) $y = \frac{3x+1}{x^2+1} \to$ مخرج همواره مثبت $\quad D_f = \mathbb{R}$

ج) $y = \frac{\sqrt{x-2}}{x-4} \to x \geq 2$

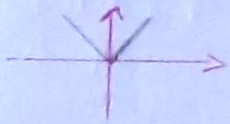
$x - 4 \to x = 4 \quad D_f = \mathbb{R} - \{4\} \,/\, [2, 4) \cup (4, +\infty)$

هـ) $\frac{2x+3}{|x|+x^2}$ $\begin{cases} x>0 \to x+x^2 \to x(x+1) \to 0, -1 \\ x<0 \to x^2-x \to x(x-1) \to 0, 1 \end{cases}$ $\to 0, 1, -1$

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

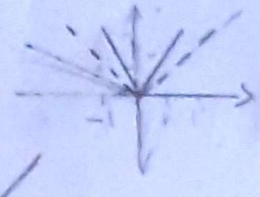
4-

$y = |x|$



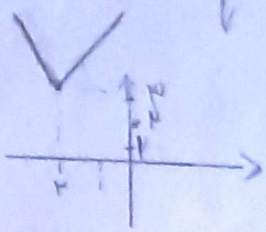
الف) $y = |x| + 2$

ب) $y = 2|x|$



ج) $y = |x+2|$

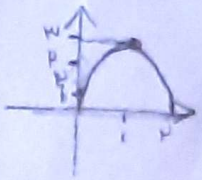
د) $y = |x+2| + 3$



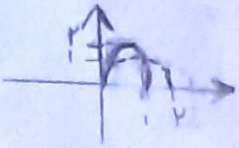
5-

$f(x) = y$

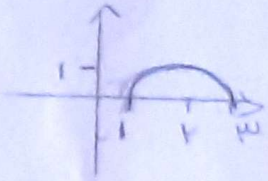
الف) $f(x) + 2$



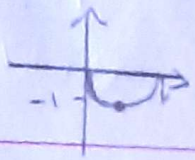
ب) $2f(x)$



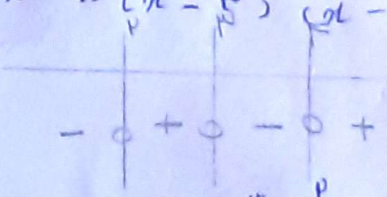
ج) $f(x-1)$



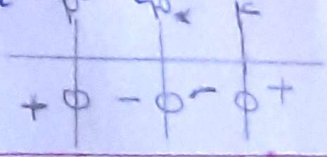
د) $-f(x)$



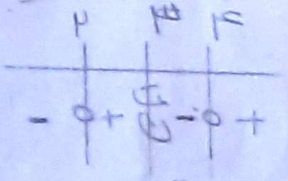
6- الف) $x^2(x-3)(x-4) = y \to x=0, x=3, x=4$



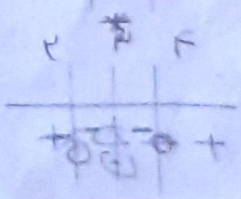
ب) $(x-2)(x-3)^2(x-4) = y \to x=2, x=3, x=4$



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



ب) $y = \frac{(x-3)(x+5)}{(x-4)^2}$



8-

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

$x^3 - 3x + 2 \mid x - 1$

$x^2 + x + 2$

$-x^3 + x^2$

$-x^2 - 3x + 2$

$-x^2 + x$

$-2x + 2$

$-2x + 2$

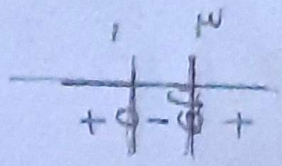
0

$x^2 + x + 2 = 0$

$\Delta < 0$

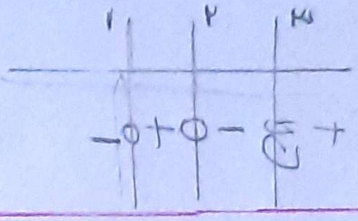
$(x-1)$

$x_1 = 1$



ب) $y = \frac{x^3 - 3x + 2}{x - 3} \rightarrow (x-2)(x-1) \rightarrow x = 2 \;,\; x = 1$

$x - 3 \rightarrow 3 = x$



9-

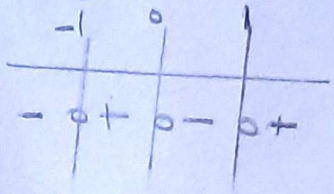
الف) $\frac{x^4 - x^2}{x^2 + x + 2} = y$

$x^2(x^2 - 1) \rightarrow x^2(x-1)(x+1) \rightarrow x = 0$

$x = 1$

$x = -1$

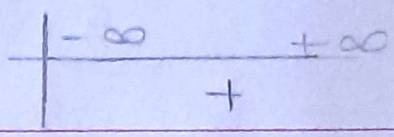
$\rightarrow \Delta < 0$



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

$\Delta < 0$

$\Delta < 0$



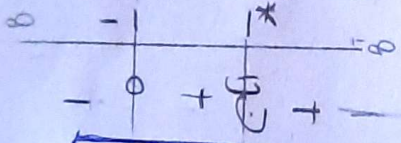
10-

الف) $y = \sqrt{\frac{x^3 - 1}{x^3 - x}}$

$\Delta < 0$

$(x-1)(x^2 + 1 + x) \rightarrow x = 1$

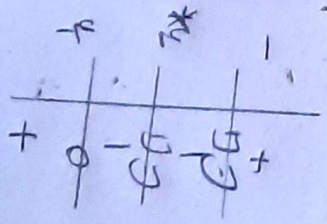
$x^3 - x \rightarrow x(x^2 - 1) \rightarrow x(x+1)(x-1) \rightarrow x = 1 \mid x = -1$



$(1, +\infty) \cup (-1, 1)$

ب) $y = \sqrt{\frac{x^2 - 16}{x^2 - 6x + 5}} = (x+4)(x-4) \rightarrow x = +4 \;,\; x = -4$

$\Rightarrow (x-5)(x-1) \rightarrow x = +5 \;,\; x = 1$



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