

نام و نام خانوادگی: پاسخنامه تشریحی تکلیف شماره: کلاس: دوازدهم ریاضی ۲	
الف) $\frac{ x +1}{ x -1} = y \quad x = \frac{-2y-1}{y-1} \quad x = \frac{y+1}{y-1} \quad \frac{y+1}{y-1} \geq \frac{1}{1-y} + \frac{1}{1+y}$ $R_A: (-\infty, -\frac{1}{2}] \cup (1, +\infty)$ ب) $y = \frac{x^2+1}{ x }$ $x > 0 \Rightarrow y = \frac{x^2+1}{x} = x + \frac{1}{x} \Rightarrow R = [1, +\infty)$ $x < 0 \Rightarrow y = \frac{x^2+1}{-x} = -x - \frac{1}{x} = -(\frac{x^2+1}{x}) \Rightarrow R = (-\infty, -1]$ $R = [1, +\infty) \cup (-\infty, -1]$	۱
$y = \frac{x^2+1}{x+1}$ $yx + y = x^2 + 1 - x - 1$ $x^2 + (1-y)x - 1 = 0$ $\Delta = (1-y)^2 - 4(-1) \geq 0 \Rightarrow (y-1)^2 + 4 \geq 0 \Rightarrow y^2 - 2y + 5 \geq 0$ $y^2 - 2y + 5 = (y-1)^2 + 4 \geq 0 + 4 - 1 + 1 = 4 > 0$ $R = (-\infty, -1] \cup [1, +\infty)$	۲
$f(x) = \frac{x^2 - x + \frac{1}{2}}{x^2 - x + 1} \rightarrow \Delta < 0 \Rightarrow D_f = \mathbb{R}$ $y = \frac{x^2 - x + \frac{1}{2}}{x^2 - x + 1} \Rightarrow y(x^2 - x + 1) = x^2 - x + \frac{1}{2} \Rightarrow (y-1)x^2 + (1-y)x + \frac{1}{2} = 0$ (I) $\Delta = (1-y)^2 - 4(y-1) \geq 0 \Rightarrow (y-1)^2 - 4(y-1) \geq 0 \Rightarrow (y-1)(y-5) \geq 0$ (II) $(I) \cap (II) \Rightarrow R = [0, 1]$	۳
الف) $y = \sqrt{-x^2 + 4x - 1}$ $\max y = \sqrt{4} = 2$ $R = \sqrt{(-\infty, 4]} = [0, 2]$ ب) $y = \sqrt{2x^2 - 12x}$ $\min y = \sqrt{-1} = 1$ $R = \sqrt{[-1, +\infty)} = [-1, +\infty)$	۴
الف) $y = \log(x^2 - x + 1)$ $= \log 1e = \log \mathbb{R} = \log (-\infty, +\infty)$ $R = (-\infty, +\infty) = \mathbb{R}$ ب) $y = \log_p \frac{x^2+1}{x} \Rightarrow \frac{x^2+1}{x} = x + \frac{1}{x} \xrightarrow{\text{بازرسی مثبت}} R_{\frac{x^2+1}{x}} = [1, +\infty) \Rightarrow \log_p [1, +\infty) \Rightarrow R = [1, +\infty)$	۵

الف) $y = 2x-1 - x-4$ $R_y = [-1, +\infty)$	ب) $y = x-4 + x+1$ $R_y = [3, +\infty)$
$x-2 - 2x+1 \leq 1$ (I) $x \geq -\infty$ (II) $x \geq \frac{1}{2}$ (III) $x \leq -3$ $(I) \cap (II) \cap (III) = \emptyset = (-\infty, -3] \cup [\frac{1}{2}, +\infty)$	4
$y = x - 2x+1 + x$ $R_y = \mathbb{R}$	14
ج) $y = [x] + [-x] + 3$ $x \in \mathbb{Z} \Rightarrow 0 + 3 = 3$ $x \notin \mathbb{Z} \Rightarrow -1 + 3 = 2$ $R_y = \{2, 3\}$	د) $y = x - [x] - x$ $x < 0 \Rightarrow y = x$ $x = 0 \Rightarrow y = 0$ $0 < x < 1 \Rightarrow y = x$ $x = 1 \Rightarrow y = 0$ $1 < x < 2 \Rightarrow y = x-1$ $x = 2 \Rightarrow y = 0$ $R_y = \mathbb{R}$
$y = \sin^2 x - \sin x + 1$ $\sin x = -1 \Rightarrow y = 3$ $\sin x = 1 \Rightarrow y = 1$ $\sin x = \frac{1}{2} \Rightarrow y = \frac{11}{4}$ $R_y = [\frac{11}{4}, 3]$	$y = \sin^2 x + \sin x + 1$ $\sin x = 0 \Rightarrow y = 1$ $\sin x = 1 \Rightarrow y = 3$ $\sin x = -\frac{1}{2} \Rightarrow y = \frac{3}{4}$ $R_y = [\frac{3}{4}, 3]$