نام و نام خانوادگی ..آرمین مشرفی.. پاسخنامه تشریحی تکلیف شماره ..1.. کلاس ..یازدهم تجربی B..

1

$A = \{1, 2, 3\}$

$B = \{2, 3\}$

$A \times B = \{(1,2), (1,3), (2,2), (2,3), (3,2), (3,3)\}$

$B^2 = \{(2,2), (2,3), (3,2), (3,3)\}$

$A \times B - B^2 = \{(1,2), (1,3)\}$

2

الف) $f(x) = \{(3, m^2), (2,1), (-3, m), (-2, m), (3, m+2), (m, 4)\}$ — $(2,1), (2,4)$ ✗

$(3, m^2), (3, m+2) \in f(x) \xrightarrow{x_1 = x_2} f(x_1) = f(x_2) \rightarrow m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) = 0 \rightarrow$ $m = 2$ غ ق ق ، $m = -1$ ✓

ب) $g(x) = \{(3, m^2), (2,1), (m, 4), (3, m+2), (-2, m), (-1, 3)\}$

$(3, m^2), (3, m+2) \in f(x) \xrightarrow{x_1 = x_2} g_1 = g_2 \rightarrow m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \rightarrow$ $m = 2$ غ ق ق $(2,1), (2,4)$ ؛ $m = -1$ غ ق ق $(-1,3), (-1,4)$

به ازای هیچ مقدار m این مجموعه g(x) تابع نخواهد بود.

3

$f(1) = 1 - 1 = 0 = a + b$

$f(2) = 8 = 2a + b$

$a = 8,\ b = -8 \rightarrow a \times b = -64$

$$f(x) = \begin{cases} x^2 - 1 & ; x \le 1 \\ ax + b & ; 1 \le x \le 2 \\ x^3 & ; x \ge 2 \end{cases}$$

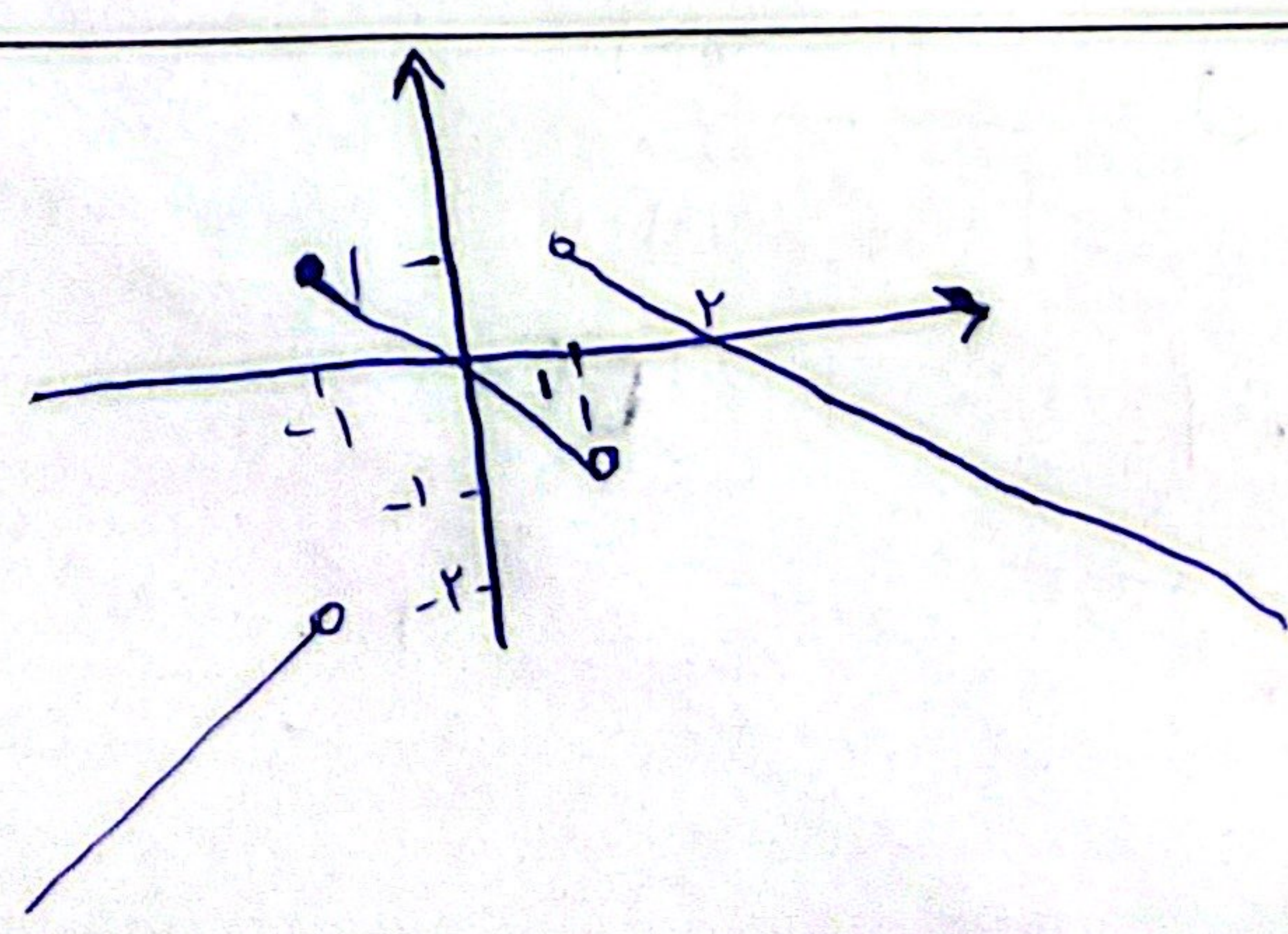
4

$$f(x) = \begin{cases} 2x - 3 & ; x \ge k \\ 4 - 3x & ; x \le k \end{cases}$$

$f(k) = 2k - 3 = 4 - 3k \rightarrow 5k = 7 \rightarrow k = \frac{7}{5} = 1.4$

5

$$f(x) = \begin{cases} -x + 2 & ; x > 1 \\ -x & ; -1 \le x < 1 \\ x - 1 & ; x < -1 \end{cases}$$



$D_f = \mathbb{R} - \{1\}$

$R_f = (-\infty, 1]$

الف) $2y^3 + x^2 + 1 = 0$

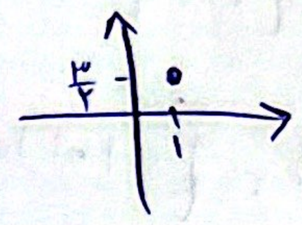
if $(x_1,y_1),(x_2,y_2) \in f \xrightarrow{x_1=x_2} y_1 = y_2$

$2y_1^3 + x_1^2 + 1 = 0$, $2y_2^3 + x_2^2 + 1 = 0$ $\xrightarrow{x_1=x_2}$ $2y_2^3 = 2y_1^3$

$2y_1^3 = -x_1^2 - 1$, $2y_2^3 = -x_2^2 - 1$ $\swarrow y_2 = y_1$ → تابع هست ✓

ب) $x^2 + 5y^2 - 2x - 12y + 10 = 0$

$(x-1)^2 + (2y-3)^2 = 0$ → تک نقطه $\left|\frac{1}{\frac{3}{2}}\right.$ → تابع هست ✓



۶

الف) $\sqrt[3]{x}\sin y = y\sin x$ $\xrightarrow[\text{مثال نقض}]{x=0}$ $y \in R$ → به ازای $x=0$ هر مقداری می‌تواند باشد

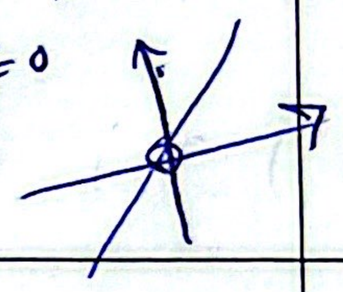
تابع هست ✓

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

$\frac{x}{y} + \frac{y}{x} + 2 \times 2$ ($\frac{x^2+y^2}{xy}$)

$x^2 + y^2 - 2xy = 0$

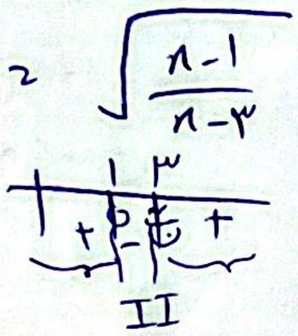
$(x-y)^2 = 0 \rightarrow x = y$, $x, y \neq 0$ → تابع هست ✓

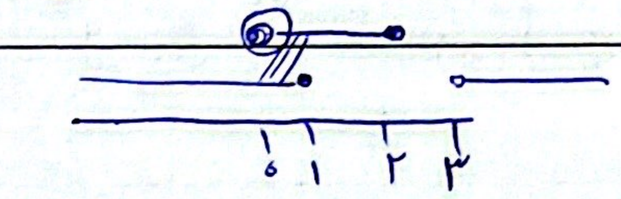


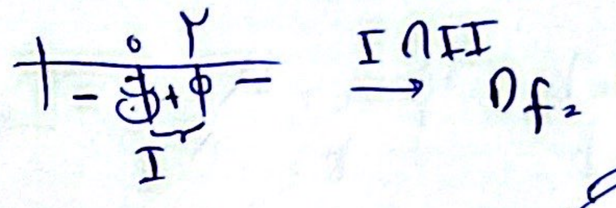
۲

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

(1) $\frac{x-1}{x-3} \geq 0$ (2) $\frac{2-x}{x} \geq 0$







$I \cup II \rightarrow D_{f_2} (0,1]$

ب) $\sqrt{x} + \sqrt{y-1} = \sqrt{3}$

$x \geq 0$ (I)

$\sqrt{y-1} = \sqrt{3} - \sqrt{x}$

$\sqrt{y-1} \geq 0 \Longrightarrow \sqrt{3} - \sqrt{x} \geq 0 \rightarrow \sqrt{3} \geq \sqrt{x}$

$3 \geq x$ (II)

شرط فقط روی x

$I \cap II \rightarrow D_f : [0,3]$ (1)

(2) $D_f : x \geq 0$, $y \geq 1$ → $y - 1 \geq 0$

الف) $y = \frac{\sqrt{x^2 - \sqrt{x} + 9}}{\sqrt{x - 10x + 19}}$ (1) (2)

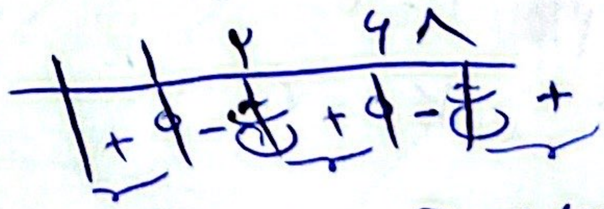
$x^2 - \sqrt{x} + 9 \geq 0$ → 

$I \cap II \rightarrow D_f = (-\infty, 1]$

$-9x + 19 > 0 \rightarrow \frac{19}{9} > x$ → II

ب) $y = \sqrt{\frac{x^2 - \sqrt{x} + 9}{x^2 - 10x + 19}}$

$\frac{x^2 - \sqrt{x} + 9}{x^2 - 10x + 19} \geq 0$

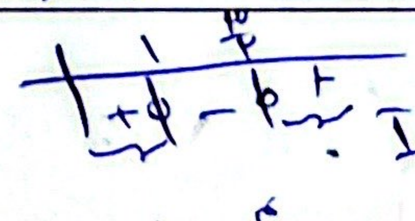


$D_f = (-\infty, 1] \cup (2, 4] \cup (9, +\infty)$

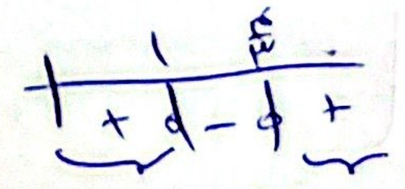
الف) $y = \frac{\sqrt{2x^2 - 5x + 3}}{\sqrt{3x^2 - \sqrt{x} + 5}}$

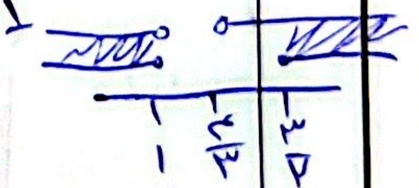
$I \cap II \rightarrow D_f = (-\infty, 1) \cup [\frac{3}{2}, +\infty)$

$2x^2 - 5x + 3 \geq 0$ (1) (3/2)



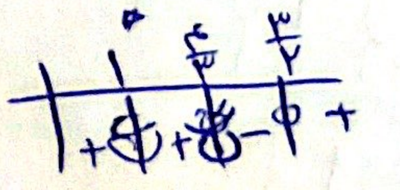
$3x^2 - \sqrt{x} + 5 > 0$ (1) (3/2)





ب) $y = \sqrt{\frac{2x^2 - 5x + 3}{3x^2 - \sqrt{x} + 5}}$

$\frac{2x^2 - 5x + 3}{3x^2 - \sqrt{x} + 5} \geq 0$ (1) (3/2)



$D_f = (-\infty, 1) \cup [\frac{3}{2}, +\infty)$