DATE: SUB: به نام خدا تکلیفی یازدهم دختر C

۲۰

۱-

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

$B^2 = \{(2,2),(2,3),(3,2),(3,3)\}$ ✓ (۷)

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

۲-

الف) $m+2 = m^2 \rightarrow m^2 - m - 2 = 0 \rightarrow m = -1, 2 \rightarrow$ $m=2$ غ ق $\Rightarrow (2,1)(2,4)$; $m=-1$

$\{(2,m^2),(2,m+2),(1,1),(m,4),(-2,m),(-3,m)\}$ (۷)

ب) $m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \rightarrow m = -1, 2 \rightarrow m=-1$ غ ق $\Rightarrow (-1,2)(-1,4)$

$m=2$ غ ق $\Rightarrow (2,1)(2,4)$

$\{(2,m^2),(2,m+2),(1,1),(-1,2),(m,4),(-2,m)\}$ به ازای هر مقداری از m تابع نیست

۳-

$$f(x) = \begin{cases} x^2 - 1 & , x \leq 1 \\ ax+b & , 1 < x < 2 \\ x^2 & , x \geq 2 \end{cases}$$

$\Rightarrow f(2) = x^2 = ax+b \rightarrow f(2) = 4 = 2a+b$

$\Rightarrow f(1) = x^2 - 1 = ax+b \rightarrow f(1) = 0 = a+b$

$$\begin{cases} 2a+b = 4 \\ a+b = 0 \end{cases}$$

$a = 4$

$b = -4$

$a \times b = 4 \times (-4) = -16$ ✓ (۷)

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ج- $f(x)=\begin{cases} 2x-3 & , x\geq 2 \\ 6-3x & , x<2 \end{cases} \Rightarrow f(2)=2^2-3=6-3 \rightarrow 2^2-3=6-3$

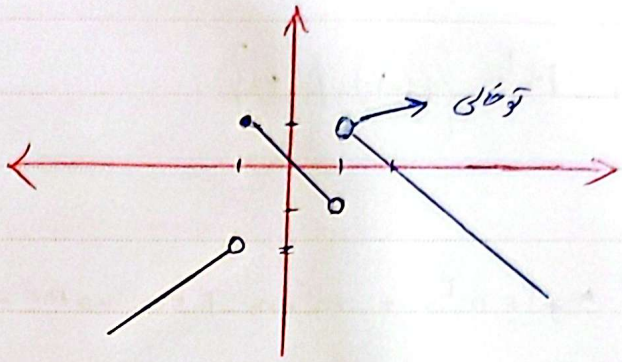
$\downarrow$

$=\frac{1}{3}$

✓ (۲)

ب-

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



(۲)

$D_f = \mathbb{R}-\{1\}$ ✓

$R_f=(-\infty,1]$

۶- الف) $2y^3+x^2+1=0 \begin{cases} x_1^2=-2y_1^3-1 \\ x_2^2=-2y_2^3-1 \end{cases} \xrightarrow{x_1=x_2} -2y_1^3-1=-2y_2^3-1$

$\downarrow$

$y_1^3=y_2^3$

$\downarrow$

$\boxed{y_1=y_2}$

تابع هست

(۲)

ب) $x^2-2x+1+4y^2-12y+9=0 \Rightarrow (x-1)^2+(2y-3)^2=0 \rightarrow \left|\begin{matrix} 1 \\ \frac{3}{2} \end{matrix}\right.$

تابع کنتظه

تابع هست

۷- الف) $x\sin y=y\sin x \longrightarrow x=0 \quad \underbrace{x\sin y}_{0}=\underbrace{y\sin x}_{0} \rightarrow y=\mathbb{R}$

✓

تابع نیست

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ب) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2 \longrightarrow a + \frac{1}{a} \geq 2, \; a > 0$ (۲)

$\Rightarrow \sqrt{\frac{x}{y}} = 1 \rightarrow (x = y)$ ثابت

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

$\frac{x-1}{x-2}\geq 0$ $\quad$ $\begin{array}{c|ccc} & 1 & 2 \\ \hline + & 0 & - \\ \end{array}$ $\quad$ I

$\frac{2-x}{x}\geq 0$ $\quad$ $\begin{array}{c|ccc} & 0 & 2 \\ \hline - & \| & + \\ \end{array}$ $\quad$ II

$I \cap II \rightarrow D_f = (0,1]$ (2)

ب) $\sqrt{x}+\sqrt{y-1}=\sqrt{3} \Rightarrow \sqrt{y-1}=\sqrt{3}-\sqrt{x} \rightarrow \sqrt{3}-\sqrt{x}\geq 0$

$x \geq 0$ ⟹ I

$3 \geq x$ ⟹ II

$I \cap II \Rightarrow [0,3]$

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الف) $y = \frac{\sqrt{x^2 - 7x + 6}}{\sqrt{-9x + 14}} = \frac{\sqrt{(x-1)(x-6)}}{\sqrt{-9x+14}}$

$(x-1)(x-6) \geq 0$ $\quad +\ 1\ -\ 6\ +$ $\quad$ I ✓

$-9x + 14 > 0$ $\quad \frac{14}{9}$ $\quad +\ -$ $\quad$ II

I ∧ II $\Rightarrow D_f = (-\infty, 1]$ (3)

ب) $y = \sqrt{\frac{x^2 - 7x + 6}{x^2 - 10x + 16}} = \sqrt{\frac{(x-1)(x-6)}{(x-2)(x-8)}}$ $\quad +\ 1\ -\ 2\ +\ 6\ -\ 8\ +$ ✓

$\Rightarrow D_f = (-\infty, 1] \cup [6, 8) \cup (8, +\infty)$

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الف) $y = \frac{\sqrt{2x^2 - 5x + 3}}{\sqrt{3x^2 - 7x + 4}} = \frac{\sqrt{(x-1)(2x-3)}}{\sqrt{(x-1)(3x-4)}}$

(2)

$(x-1)(2x-3) \geq 0$ $\quad +\ 1\ -\ \frac{3}{2}\ +$ $\quad$ I ✓

$(x-1)(3x-4) > 0$ $\quad +\ 1\ -\ \frac{4}{3}\ +$ $\quad$ II

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

ب) $y = \sqrt{\frac{2x^2 - 5x + 3}{3x^2 - 7x + 4}} = \sqrt{\frac{(x-1)(2x-3)}{(x-1)(3x-4)}}$

$+\ 1^*\ +\ \frac{3}{2}\ -\ \frac{4}{3}\ +$ $\longrightarrow D_f = (-\infty, \frac{4}{3}) \cup [\frac{3}{2}, +\infty) - \{1\}$ ✓