نام و نام خانوادگی ......مبینا پروین............ پاسخنامه تشریحی تکلیف شماره ...1... کلاس ...یازدهم ریاضی B............

1

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

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

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

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

2

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

$m^2=m+2 \rightarrow m^2-m-2=0$

$(m-2)(m+1)=0 \rightarrow m= 2$ غ ق ق ×, -1

$m=2 \rightarrow \times\ (2,1),(2,4) \rightarrow m=-1$

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

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

$m = 2 \rightarrow$ غ ق ق $\rightarrow (2,1),(2,4)$

$m = -1$ غ ق ق × $\rightarrow (-1,4),(-1,3)$

$m=2$ به ازای هیچ مقدار m عبارت مقابل تابع نیست

3

$$f(x)=\begin{cases} x^2-1 \ ; & x\le 1 \longrightarrow x^2-1 \xrightarrow{x=1} 1-1=0 \\ ax+b \ ; & 1\le x\le 2 \longrightarrow ax+b \xrightarrow{x=1} a+b \ , \ ax+b \xrightarrow{x=2} 2a+b \\ x^3 \ ; & x\ge 2 \longrightarrow x^3 \xrightarrow{x=2} 8 \end{cases}$$

$\left.\begin{array}{l} a+b=0 \\ 2a+b=8 \end{array}\right\} \rightarrow a=8 \ , \ b=-8 \qquad a\times b=-8\times 8=-64$

4

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

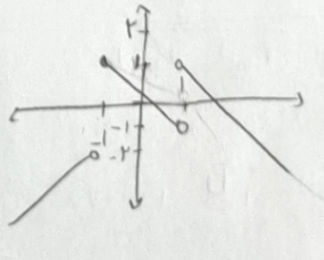
$2k-3=4-3k$

$5k=7$

$k=\frac{7}{5}$

5

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



$D_f=\mathbb{R}-\{1\} \qquad R_f=(-\infty,1]$

۶

الف) $2y^3 + x^2 + 1 = 0$

$2y_1^3 = -x_1^2 - 1$, $2y_2^3 = -x_2^2 - 1$

$x_1 = x_2 \to 2y_1^3 = 2y_2^3$

$y_1^3 = y_2^3 \to y_1 = y_2$ تابع هست ✓

ب) $x^2 + 4y^2 - 2x - 12y + 10 = x^2 + 4y^2 - 2x - 12y + 9 + 1 = 0$

$(x^2 - 2x + 1) + (4y^2 - 12y + 9) = 0$

$(x-1)^2 + (2y-3)^2 = 0$

$x - 1 = 0 \to x = 1$

$2y - 3 = 0 \to 2y = 3 \to y = \frac{3}{2}$

تابع هست - تک نقطه ✓

۷

الف) $x \sin y = y \sin x$

$x = 0$ $\quad 0 \times \sin y = y \times \sin 0$

$0 \times \sin y = y \times 0 \to 0 = 0$ y هر عددی می‌تواند باشد، تابع نیست ✗

ب) $\left(\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2\right)^2$

$\frac{x}{y} + \frac{y}{x} + 2 = 4 \to \frac{x^2 + y^2}{xy} = 2$

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

$(x - y)^2 = 0 \to x = y$ تابع هست ✓

۸

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

$\frac{x-1}{x-3} \geq 0$ $\quad$ 1 , 3 : $+ \; 0 \; - \; \| \; +$ ①

$\frac{3-x}{x} \geq 0$ $\quad$ 0 , 3 : $- \; \| \; + \; 0 \; -$ ②

① ∩ ② (0 1 2 3)

① ∩ ② $= (0, 1] = D_f$

ب) $\sqrt{x} + \sqrt{y-1} = \sqrt{3}$

$\sqrt{x} \geq 0 \to x \geq 0$ ①

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

$\sqrt{3} - \sqrt{x} \geq 0 \to \sqrt{x} \leq \sqrt{3} \to x \leq 3$ ②

① ∩ ② $\to D_f = [0, 3]$

۹

الف) $y = \frac{\sqrt{x^2 - 5x + 4}}{\sqrt{x - 10x + 16}}$ $\to x^2 - 5x + 4 \geq 0$, $16 - 9x > 0$

$(x-4)(x-1) \geq 0$ $\quad$ 1 , 4 : $+ \; 0 \; - \; 0 \; +$ ①

$16 > 9x \to x < \frac{16}{9}$ ② $\quad$ (1 , $\frac{16}{9}$, 4)

① ∩ ② $= D_f = (-\infty, 1]$

ب) $y = \sqrt{\frac{x^2 - 5x + 4}{x^2 - 10x + 16}} \geq 0$

$\frac{(x-4)(x-1)}{(x-8)(x-2)} \geq 0$ $\quad$ 1 , 2 , 4 , 8 : $+ \; 0 \; - \; \| \; + \; 0 \; - \; \| \; +$

$D_f = (-\infty, 1] \cup (2, 4] \cup (8, +\infty)$

۱۰

الف) $y = \frac{\sqrt{2x^2 - 5x + 3}}{\sqrt{3x^2 - 7x + 4}}$ ≥ 0 , > 0

$2x^2 - 5x + 3 \geq 0$ $\quad x^2 - 5x + 6 = (x-3)(x-2)$

$x = \frac{3}{2} , \frac{2}{2} = 1$ ① $\quad 3x^2 - 7x + 4 > 0$

$x^2 - 7x + 12 = (x-4)(x-3) \to x = \frac{4}{3} , \frac{3}{3} = 1$ ②

ب) $y = \sqrt{\frac{2x^2 - 5x + 3}{3x^2 - 7x + 4}} \geq 0$

$\frac{(2x-3)(x-1)}{(3x-4)(x-1)} \geq 0$ $\quad$ 1 , $\frac{4}{3}$, $\frac{3}{2}$: $+ \; \| \; + \; \| \; - \; 0 \; +$

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

① ∩ ② $\to$ (1 , $\frac{4}{3}$, $\frac{3}{2}$) $\to D_f = (-\infty, 1) \cup [\frac{3}{2}, +\infty)$

1 , $\frac{3}{2}$: $+ \; 0 \; - \; 0 \; +$ $\quad$ 1 , $\frac{4}{3}$: $+ \; 0 \; - \; 0 \; +$