«امیرعلی وحید»

۱-

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

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

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

جواب نهایی → $\{(1,2)(1,3)\}$

۲-

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

2 → ✗ ← چون به ما دارای ۳ و ۴ را می دهد

-1 → ✓

ب) $m^2=m+2 \rightarrow m^2-m-2 \Rightarrow m=2, -1$

← به ازای هیچ مقداری از m.

۳-

$x=1 \rightarrow x^2-1=ax+b \rightarrow a+b=0$

$x=2 \rightarrow x^3=ax+b \rightarrow 2a+b=8$

$\rightarrow a=8,\ b=-8 \xrightarrow{\times} -64$

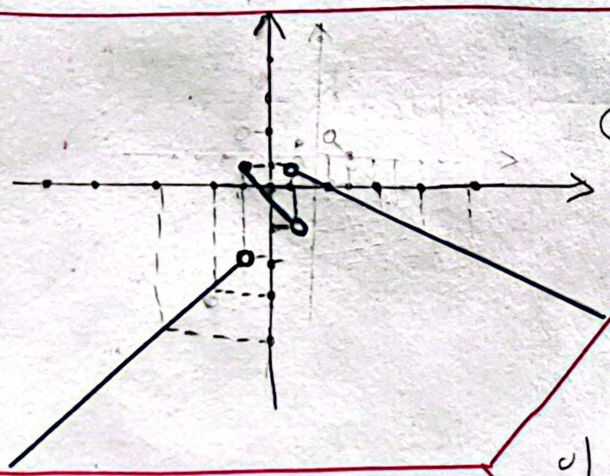
۴-

$x=k \rightarrow 2x-3=4-3x \rightarrow 5x=7 \rightarrow x=\frac{7}{5} \xrightarrow{\text{پس}} k=\frac{7}{5}$

۵-

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

$R_f=(-\infty,1]$



۶-

الف) $2y^3=-x^2-1$ ✓

← تعریف ریاضی

$2y_1^3=2y_2^3 \rightarrow y_1=y_2$

ب) $x^2-2x+1+4y^2-12y+9=0$ ✓

$(x-1)^2+(2y-3)^2=0 \rightarrow x=1,\ 2y=3 \rightarrow y=\frac{3}{2}$

الف) $x=0°$ ✗

$x\sin y = y\sin x$

$\sin y=0 \rightarrow y=180°,\ y=0°$

۷-

ب) $\left(\sqrt{\frac{x}{y}}+\sqrt{\frac{y}{x}}=2\right)^2 \Rightarrow \frac{x}{y}+\frac{y}{x}+2=4$ ✓

$\frac{x^2+y^2}{xy}=2 \rightarrow x^2+y^2-2xy=0$

$(x-y)^2=0$

$x=y$

۸-

$\frac{x-1}{x-3}\geq 0 \rightarrow (-\infty,1]\cup(3,+\infty)$

$\frac{2-x}{x}\geq 0 \rightarrow (0,2]$

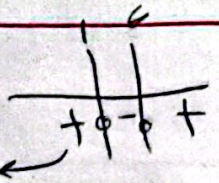
$\xrightarrow{\cap} D_f=(0,1]$

ب) $\sqrt{y-1}=\sqrt{3-\sqrt{x}} \longrightarrow x \geq 0$

$\sqrt{y-1} \longrightarrow x \leq 3$ چون که جواب $\sqrt{y-1}$ نباید منفی باشد.

$\Longleftarrow$ پس $0 \leq x \leq 3$

۹- الف) $\sqrt{x^2-7x+6} \longrightarrow x^2-7x+6 \geq 0 \longrightarrow (x-1)(x-6) \geq 0 \longrightarrow$



$(-\infty, 1] \cup [6, +\infty)$

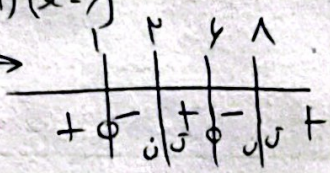
$\sqrt{-9x+16} \longrightarrow -9x+16 > 0$

$16 > 9x \longrightarrow \frac{16}{9} > x$

$\cap \longrightarrow D_f = (-\infty, 1]$

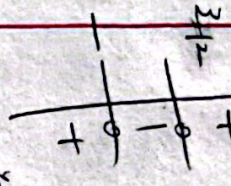
ب) $\frac{x^2-7x+6}{x^2-10x+16} \geq 0 \longrightarrow$ $x^2-7x+6 \longrightarrow (x-1)(x-6)$

$x^2-10x+16 \longrightarrow (x-2)(x-8)$



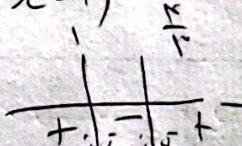
$D_f = (-\infty, 1] \cup (2, 6) \cup [8, +\infty)$

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



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

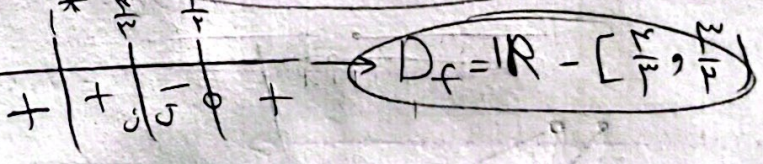
$\sqrt{3x^2-7x+4} \longrightarrow 3x^2-7x+4 > 0 \longrightarrow (x-1)(3x-4)$



$(-\infty, 1) \cup (\frac{4}{3}, +\infty)$

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

ب) $\frac{2x^2-5x+3}{3x^2-7x+4} \geq 0 \longrightarrow \frac{(x-1)(2x-3)}{(x-1)(3x-4)}$



$D_f = \mathbb{R} - [\frac{4}{3}, \frac{3}{2}]$