ریاضیات گسسته - دوازدهم تجربی B — باسمه تعالی — تألیف ...

۱. الف)
$y=(x-2[\frac{x}{2}])^2=4(\frac{x}{2}-[\frac{x}{2}])^2 \Rightarrow 0\le \frac{x}{2}-[\frac{x}{2}]<1$
$\rightarrow 0\le y<4 \rightarrow R=[0,4)$

ب)
$-\sin x+\log y-4=0 \rightarrow \log y=\sin x+4 \rightarrow 3\le \sin x+4\le 5$
$\rightarrow 3\le \log y\le 5 \rightarrow 10^3\le 10^{\log y}\le 10^5 \rightarrow R=[10^3,10^5]$

۲-
$\sqrt{\frac{x^2-4}{x^2-9}}$ $x_{max}=+\infty$, $x_{min}=0$ $\begin{cases} f_{max}=1 \\ f_{min}=\frac{4}{9}\end{cases} \Rightarrow (-\infty,\frac{4}{9}]\cup(1,+\infty)$

زیر رادیکال $\rightarrow [0,\frac{2}{3}]\cup(1,+\infty) \rightarrow 0+\frac{2}{3}+1=\frac{5}{3}$

۳- الف)
$f(x)=x+\frac{1}{x}+2\sqrt{x+\frac{1}{x}} \rightarrow D_f=(0,+\infty) \rightarrow x+\frac{1}{x}\ge 2 \rightarrow 2+2\sqrt{2}=min, +\infty=max$
$R_f=[2+2\sqrt{2},+\infty)$

ب)
$y=(3-\sin x)(1+\sin x)=3+3\sin x-\sin x-\sin^2 x=-\sin^2 x+2\sin x+3$
$max \xrightarrow{\sin x=1} x=4 \quad min \xrightarrow{\sin x=-1} x=0 \quad -\frac{b}{2a}\xrightarrow{\frac{-2}{-2}} 1 \rightarrow x=4$
$R_y=[0,4]$

۴-
$f(x)=-\frac{1}{2}x+10 \quad D_f=\{1,2,\dots,9\} \quad f(1)=\frac{19}{2}, f(2)=\frac{18}{2}, \dots \frac{11}{2}$

$S=\frac{n}{2}(2a_1+(n-1)d)$
$\frac{n}{2}(a_1+a_n)$ $\Big\}\ \frac{225}{3}=\frac{75}{2}$

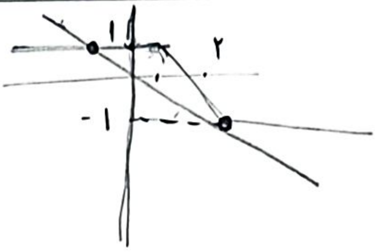
۵- $f(x)=\sqrt{ax^2+bx+c}$ $D_f=[2,+\infty)$

$a=2 \to 2b+c=0$ و $x=3 \to 3b+c=1$ و $b>0$ و $a=0 \to y=ax+b$

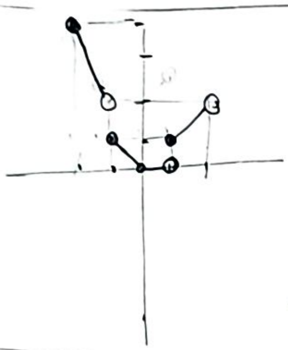
$b=1$ و $c=-2 \to g(x)=\sqrt{x^2+4} \to \min=2 \to R=[2,+\infty)$

۶- $|x-2|-|x-1|=kx \to x=2,1$

$f(2)=-1 \to 2k=-1 \to k=-\frac{1}{2}$



۷- الف)



$f(x) \to -2\le x<-1 \to y=-2x \to 4,2$

$f(x) \to -1\le x<0 \to y=-x \to 1,0$

$f(x) \to 0\le x<1 \to y=0$

$f(x) \to 1\le x<2 \to y=x \to 1,2$

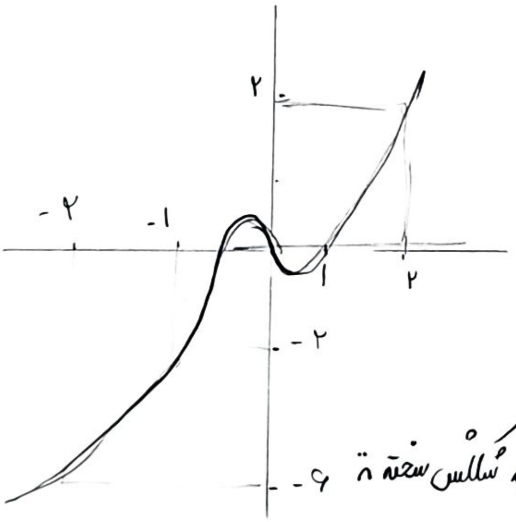
$R_f=[0,4]-\{2\}$

ب)

$f(x) \to x\geq 0 \to x^2-x$

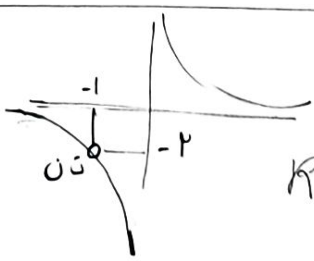
$f(x) \to x<0 \to -x^2+x$

$R_y=[-6,2]$



ببخشید شکلش شلخته شد

۸- $\frac{1}{x}+\frac{1}{x+1}+\frac{1}{x^2+x}=\frac{2(x+1)}{x(x+1)}=\frac{2}{x} \to x\neq 0,-1$



$R_y=\mathbb{R}-\{0,-2\}$

$0-2=-2$

۰/۵ ها ∫ سازی

۹-

$$f(x) = \frac{(\sqrt{x}-1)(\sqrt{x}-3)}{(\sqrt{x}-1)(\sqrt{x}-1)} = \frac{\sqrt{x}-3}{\sqrt{x}-1}$$

$\min\sqrt{x} \xrightarrow{0} \frac{-3}{-1} = 3$

$\max\sqrt{x} \xrightarrow{+\infty} 1$

$\Big\{ R_f = (-\infty, 1) \cup [3, +\infty)$

-۱۰

$$f(x) = \frac{x^3 + 2x^2 - x - 2}{x^2 - 1} = \frac{(x-1)(x+1)(x+2)}{(x+1)(x-1)} = x + 2 - 1. \quad x \neq 1, -1$$

$x = \mathbb{R} - \{1, 2\} \longrightarrow$ ۴،۳،۲