حسن شهبازی

۱-

$y = -\frac{1}{3}x^2 + \frac{2}{5}x + 1 \qquad -\frac{1}{3}\left(\frac{9}{25}\right) + \frac{6}{25} + 1 = \frac{25}{25} + \frac{3}{25} = \frac{28}{25}$

$x = \frac{-b}{2a} = \frac{-\frac{2}{5}}{-\frac{2}{3}} = \frac{3}{5} \qquad y = -\frac{1}{3}\left(x - \frac{3}{5}\right)^2 + \frac{28}{25}$

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

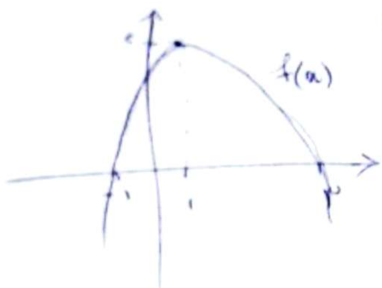
$-\frac{1}{3}(x-4)^2 + 3 = 0 \qquad (x-4)^2 = 9 \qquad x = 4 \pm 3$

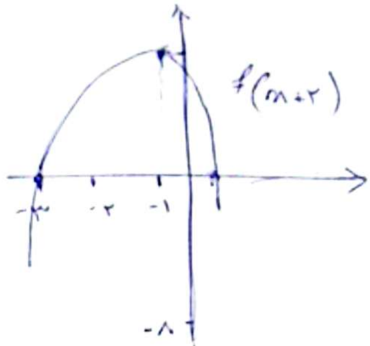
$\boxed{x = 1}$

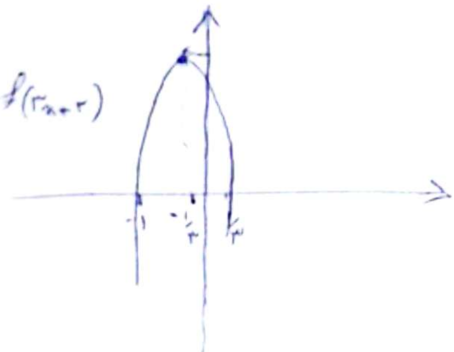
$\boxed{x = 7}$

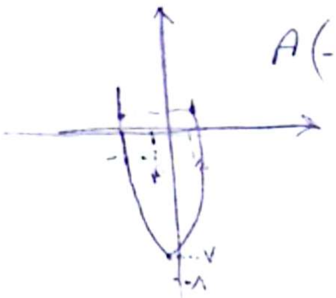
۲-

$y = 1 - 2f(3x+2) \longrightarrow -2f(3x+2) + 1$









$A\left(-\frac{1}{3}, -7\right)$

۳-

$y = 3 - \sqrt{2x} \qquad y = \sqrt{2x+2} + \cancel{4} \qquad \sqrt{2x+2} + \cancel{4} = \frac{7}{2}$

$3 - \sqrt{2(x+1)} \longrightarrow -3 + \sqrt{2x+2} + 6$

$\sqrt{2x+2} = \frac{7}{2} - \frac{3}{2}$

$\boxed{x = \frac{1}{8}}$

$2x + 2 = \frac{9}{4} \qquad 2x = \frac{1}{4}$

$2x = \frac{9}{4} - \frac{8}{4} \qquad x = \frac{1}{8}$

$\cancel{D_f = [a, 4]}$

$\cancel{D_g = [-1, b)}$

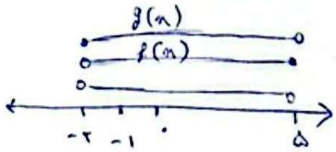
۴-

$-2 < x < 5 \qquad D_{f(x-1)} \cap D_{g(x+1)} = (-2, 5)$

$D_f = a \le x \le 4$

$a \le x - 1 \le 4 \to a+1 \le x \le 5$

$-1 \le x + 1 < b \quad -2 \le x < b-1$



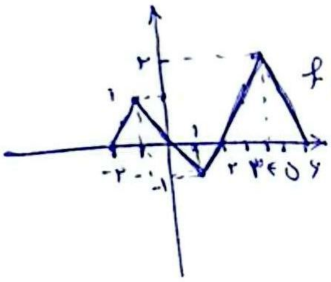
$b - 1 = 5$

$\boxed{b = 6}$

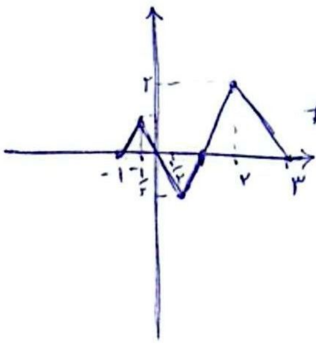
$a + 1 = -2 \quad \boxed{a = -3}$

$\boxed{a - b = -3 - (6) = -9}$

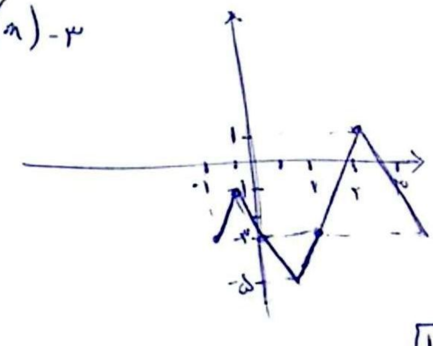
۵-

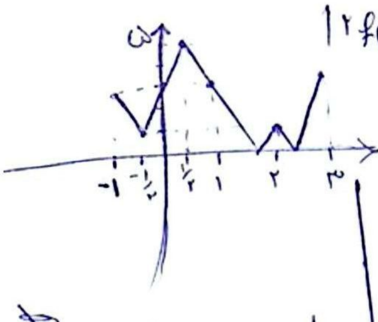


$\Longrightarrow$



$2f(x) - 3$



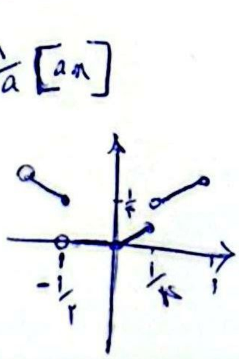


$R_f = [0, 5]$

$D_f = [-1, 3]$

$\sqrt{|2f(x) - 3|} \to |2(f(x) - 3| \ge 0$

$y = \frac{x}{a}[ax]$



$a = 4 \qquad \boxed{1 - 4 = -3}$

$y = \frac{x}{4}[4x]$

-۷

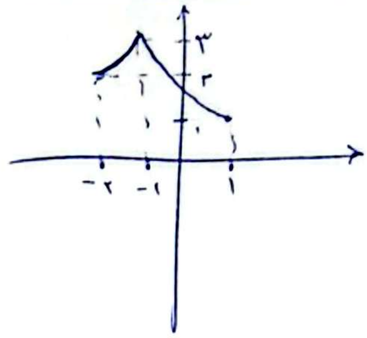
$f(x)=\log_{۲}^{x} \longrightarrow \log_{۲}^{x+۲} \longrightarrow -\log_{۲}^{x+۲} \longrightarrow -\log_{۲}^{-x+۲}+۳$

$g(x)=-\log_{۲}^{-x+۲}+۳ \qquad g(-۱۴)+g(-۶۲)=\cancel{-\log_{۲}^{-(-۱۴)+۲}}+۳-\log_{۲}^{-(-۶۲)+۲}+۳=$

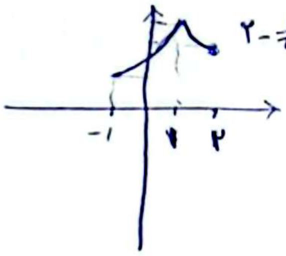
$\boxed{-۴+۳-۶+۳=-۴}$

-۸

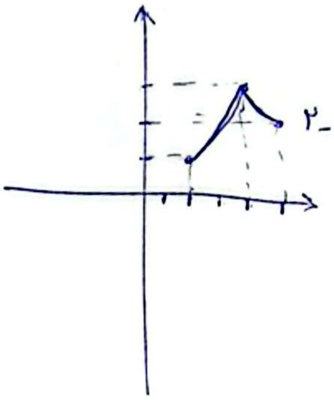
$y=۲-f(۳-x) \qquad -۲\leq ۳-x\leq ۱ \quad -۵\leq -x\leq -۲ \quad ۲\leq x\leq ۵$



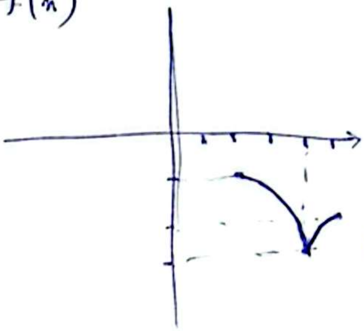
$y_۲=f(x-۱)-۱$



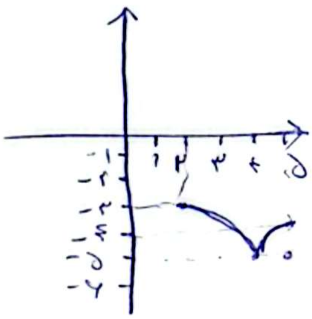
$۲-f(۳+x)$

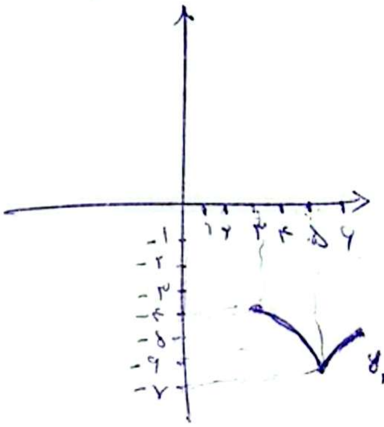


$۲-f(x)$



$۲+f(x)$





$y_۲=f(x-۱)-۱$

$f(x)=\left|\dfrac{x+۱}{۲x+۱}\right| \qquad \left|\dfrac{(x-۳)+۱}{۲(x-۲)+۱}+۱\right| \Rightarrow \left|\dfrac{x-۱}{۲x-۳}+۱\right|$

$\dfrac{-۳x+۴}{۲x-۳}<x$

$-۳x+۴<۲x^۲-۳x$

$-۲x^۲+۴<۰$

$-۲(x^۲-۲)<۰$

$\begin{array}{c|c|c} -\sqrt{۲} & & \sqrt{۲} \\ \hline + & - & + \end{array}$

$\left|\dfrac{x-۱+۲x-۳}{۲x-۳}\right|=\left|\dfrac{۳x-۴}{۲x-۳}\right| \qquad \left|\dfrac{۳x-۴}{۲x-۳}\right|<-x \qquad \dfrac{۳x-۴}{۲x-۳}<x$

$۳x-۴<۲x^۲-۳x$

$-۲x^۲+۶x-۴<۰$

$\begin{array}{ccccc} & ۱ & & ۲ & \\ \hline + & \circ & - & \circ & + \end{array}$

ادامه سوال ۹

$-2x^2+4<0 \qquad -2(x^2-2)<0$

$x^2-2>0$

$(x-\sqrt{2})(x+\sqrt{2})>0$

$-\sqrt{2}$		$\sqrt{2}$	
+	−		+

$-2x+6x-4<0 \qquad (x-2)(x-1)<0$

1		2	
+	−		+

$\cap$

اشتراک $(\sqrt{2}, 2)$

$(1,2)\cap(-\infty,-\sqrt{2})\cup(\sqrt{2},+\infty) = \boxed{(\sqrt{2},2)}$

۱۰.

$f(x)$

$g(x)=\sqrt{28f(x)-f^2(x)}$

$f(x)(28-f(x))\geq 0$

	0		28	
−		+		−

$D_{g(x)}=[0,28] \longrightarrow$

$0\leq f(x)\leq 28 \qquad D_g=[0,3)$

$0\leq x<3$

$D_g \mid x\in\mathbb{Z}=\{0,1,2\}$