Year. Month. Date.

مریم توکلی دوازدهم صفحه ۸ فعالیت ۷

سوال ۱)

$y=-\frac{1}{3}x^2+\frac{2}{5}x+1 \quad (4,3)$

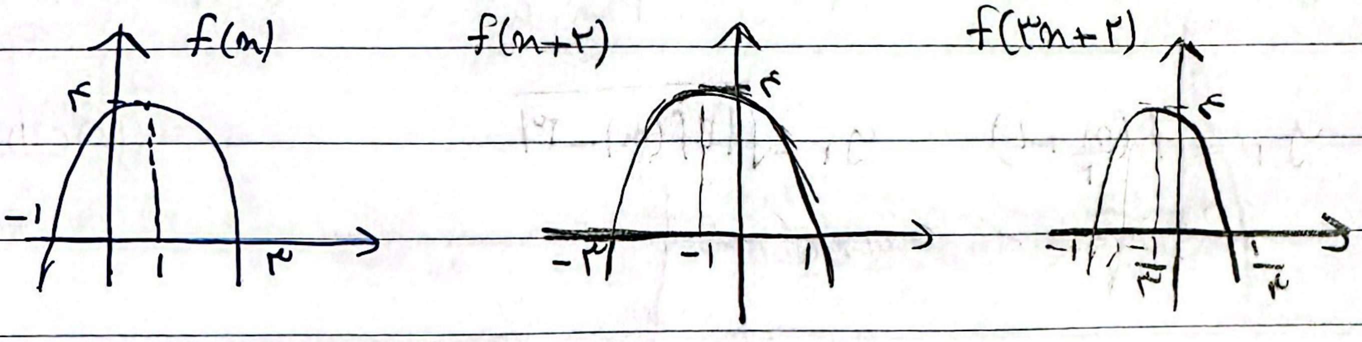
$\rightarrow -\frac{1}{3}(x-x_{ext})^2+y_{ext} \xrightarrow[\text{رأس سهمی}]{(4,3)} y=-\frac{1}{3}(x-4)^2+3$

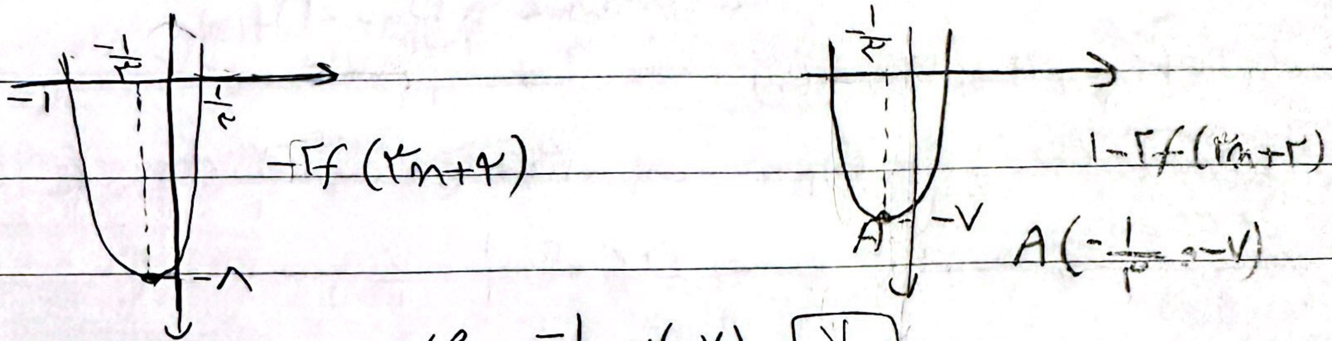
$\rightarrow y=0 \Rightarrow -\frac{1}{3}(x-4)^2+3=0 \rightarrow (x-4)^2=9 \rightarrow x-4=3 \rightarrow \boxed{x=7}$

$x-4=-3 \rightarrow \boxed{x=1}$

سوال ۲)

$A(\alpha,\beta) \quad y=1-2f(3x+2) \quad \alpha\beta=?$





$\alpha\beta=-\frac{1}{3}\times(-7)=\boxed{\frac{7}{3}}$

سوال ۳)

$y=3-\sqrt{2x}$

$y=3-\sqrt{2x} \xrightarrow[\text{سمت چپ}]{\text{یک واحد}} 3-\sqrt{2(x+1)} \xrightarrow[\text{طول‌ها}]{\text{قرینه نسبت به محور}} \sqrt{2(x+1)}-3$

$\xrightarrow{\text{۵ واحد به سمت}} \sqrt{2(x+1)}+2 \Rightarrow y=\sqrt{2x+2}+2 \rightarrow \sqrt{2x+2}+2=\frac{7}{2}$

$\Rightarrow \sqrt{2x+2}=\frac{3}{2} \rightarrow 2x+2=\frac{9}{4} \rightarrow 2x=\frac{1}{4} \Rightarrow \boxed{x=\frac{1}{8}}$

آپادانا

سوال ۴)

$D_f = (a, 4] \qquad D_g = [-1, b)$

$y = f(x-1) + g(x+1) \rightarrow D = (-2, 5) \qquad a - b = ?$

$-1 \leq x+1 < b \rightarrow -2 \leq x < b-1$

$\Rightarrow D_{g(x+1)} = [-2, b-1)$

$a < x-1 \leq 4 \rightarrow a+1 < x \leq 5 \Rightarrow D_{f(x-1)} = (a+1, 5]$

$\xrightarrow{\text{اشتراک می‌گیریم}} (a+1, b-1) \rightarrow b-1 = 5 \Rightarrow \underline{b=6}$

(از صورت سوال متوجه می‌شویم)

$\hookrightarrow a+1 = -2 \Rightarrow \underline{a=-3} \rightarrow a-b = -3-6 = \boxed{-9}$

سوال ۵)

$y_1 = f(\frac{x}{2}+1) \qquad y_2 = \sqrt{|2f(x)-3|}$

زیر رادیکال باید صفر یا بزرگتر از آن باشد

همواره برقرار است!! $\Rightarrow D_{y_2} = D_{f(x)}$

$y_1 = f(\frac{x}{2}+1) \rightarrow y = f(x)$

$D_1 = [-3, 5] \Rightarrow D_f = ? \rightarrow -3 \leq x \leq 5 \rightarrow -\frac{3}{2} \leq \frac{x}{2} \leq \frac{5}{2}$

$\rightarrow -\frac{1}{2} \leq \frac{x}{2}+1 \leq \frac{7}{2} \Rightarrow D_f = [-\frac{1}{2}, \frac{7}{2}] \Rightarrow \boxed{D_2 = [-\frac{1}{2}, \frac{7}{2}]}$

محاسبه برد

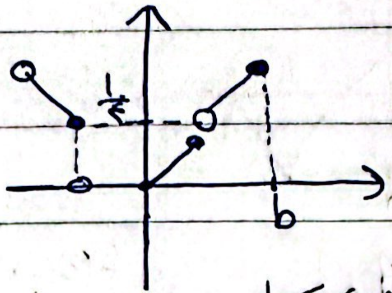
$-1 \leq y_1 \leq 2 \rightarrow -2 \leq 2y_1 \leq 4$

$\rightarrow -5 \leq 2y_1 - 3 \leq 1 \rightarrow 0 \leq |2y_1 - 3| \leq 5$

$\rightarrow 0 \leq \sqrt{|2y_1-3|} \leq \sqrt{5} \rightarrow \boxed{R_g = [0, \sqrt{5}]}$

سوال ۶)

$y = \frac{x}{a}[ax] \qquad b - a = ?$



$0 \leq ax < 1 \Rightarrow 0 \leq x < \frac{1}{a}$ غ ق ق

$[ax] = 0 \Rightarrow \frac{1}{a} < x \leq 0 \longrightarrow [ax] = 0$

$y = 0$

$1 \leq ax < 2 \longrightarrow \frac{2}{a} < x \leq \frac{1}{a} \Rightarrow a = \frac{x}{a} \Rightarrow a < 0$

$[ax] = 1$

$\longrightarrow A(\frac{1}{a}, \frac{1}{4}) \Rightarrow \frac{\frac{1}{a}}{a} = \frac{1}{4}$

$\Rightarrow a^2 = 4 \longrightarrow a = \pm 2 \longrightarrow a = -2$ (چون $a < 0$)

$y = -\frac{x}{2}[-2x] \longrightarrow$ طول نقطه $= \frac{1}{2} \longrightarrow b = 2 \times \frac{1}{2} = 1 \longrightarrow b - a = 1 + 2 = \boxed{3}$

سوال ۷)

$f(x) = \log_2 x$

$f(x) = \log_2 x \xrightarrow[\text{سمت چپ}]{\text{۲ واحد به}} y = \log_2(x+2) \xrightarrow[\text{محور } x]{\text{قرینه نسبت به}} y = -\log_2(x+2)$

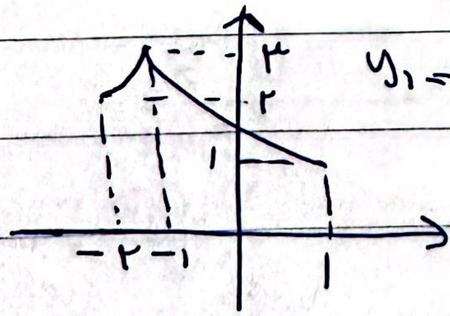
$\xrightarrow[\text{بالا}]{\text{۳ واحد به سمت}} y = -\log_2(x+2) + 3 \xrightarrow[\text{محور } y\text{ها}]{\text{قرینه نسبت به}} y = -\log_2(-x+2) + 3$

$\Rightarrow g(x) = -\log_2(-x+2) + 3 \longrightarrow g(-62) = -\log_2(62+2) + 3 = -6 + 3 = -3$

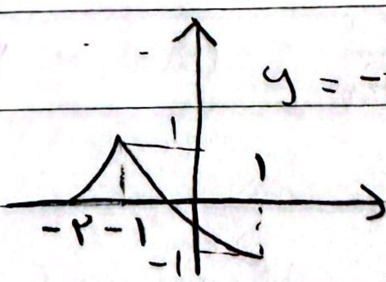
$\longrightarrow g(-14) = -\log_2(14+2) + 3 = -4 + 3 = -1$

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

سوال ۸)



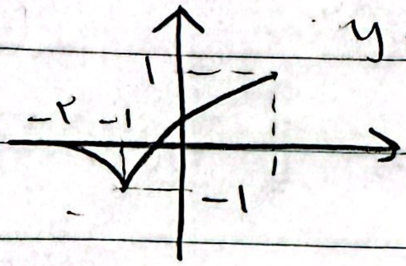
$y_1 = 2 - f(3-x)$



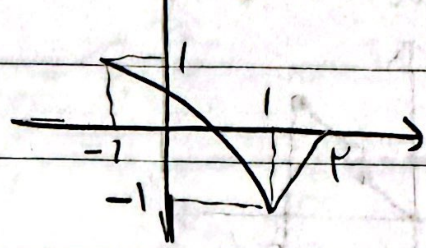
$y = -f(3-x)$

* ادامه در صفحه بعد

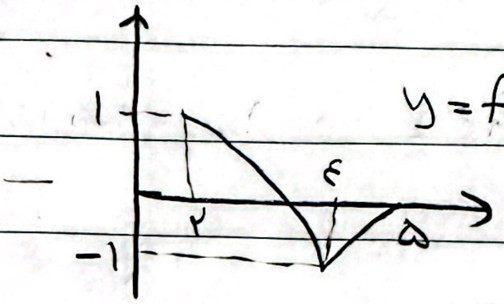
$y = f(3-x)$



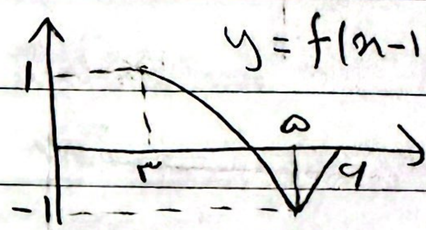
$y = f(x+3)$



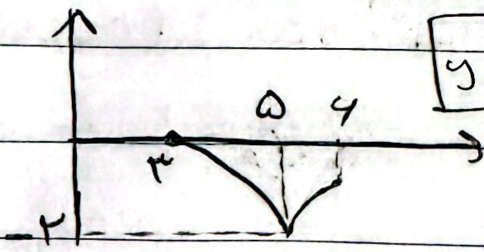
$y = f(x)$



$y = f(x-1)$



$\boxed{y = f(x-1) - 1}$



سوال ۹)

$f(x) = \left|\frac{x+1}{2x+1}\right| \qquad x + g(x) < 0$

۲ واحد به سمت راست

$f(x) = \left|\frac{(x-2)+1}{2(x-2)+1}\right| \xrightarrow[\text{سمت بالا}]{\text{یک واحد به}} g(x) = \left|\frac{x-1}{2x-3}\right| + 1$

$x + g(x) < 0 \Rightarrow x + 1 + \left|\frac{x-1}{2x-3}\right| < 0 \Rightarrow \left|\frac{x-1}{2x-3}\right| < -(x+1)$

$\longrightarrow \frac{x-1}{2x-3} < -(x+1) \Rightarrow \frac{2x^2-4}{2x-3} < 0$

	$-\sqrt{2}$		$\sqrt{2}$		$\frac{3}{2}$	
$-$		$+$		$-$		$+$

$(-\infty, -\sqrt{2}) \cup (\sqrt{2}, \frac{3}{2})$

$\longrightarrow \frac{x-1}{2x-3} > x+1 \Rightarrow \frac{-2(x^2-x-1)}{2x-3} > 0 \rightarrow$

	$\frac{1-\sqrt{5}}{2}$		$\frac{3}{2}$		$\frac{1+\sqrt{5}}{2}$	
$+$		$-$		$+$		$-$

$(\frac{1-\sqrt{5}}{2}, \frac{3}{2}) \cup (\frac{1+\sqrt{5}}{2}, +\infty)$

در کل $\rightarrow \boxed{x \in (-\infty, -\sqrt{2})}$

Subject:
Year. Month. Date.

سوال ۱۰)

$y = x^3$ $\qquad g(x) = \sqrt{28f(x) - f^2(x)}$

$f(x) = (x-2)^3 + 27 \Rightarrow$ اکیداً صعودی است

$(x-2)$: ۲ واحد به سمت راست

$+27$: ۲۷ واحد به بالا

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

$f(x) = 28$ یا

$\Rightarrow \underline{x = 3}$

$f(x) = 0 \Rightarrow \underline{x = -1}$

تعیین علامت $\Rightarrow$

-1		3
$-$	$+$	$-$

$\Rightarrow D_g = [-1, 3]$

تعداد اعداد صحیح $\rightarrow 3 - (-1) + 1 = \boxed{5}$