۱- $f(x)$ $D_{f(x)} = [-2,4]$ $f\left(\frac{3x+2}{5}\right) \to -2 \le \frac{3x+2}{5} \le 4 \to -10 \le 3x+2 \le 20$ (۲)

$-12 \le 3x \le 18 \to -4 \le x \le 6 \to D_f = [-4,6]$

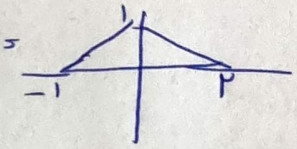
۲- $f(3x-2)$ $D_f = [-2,3] \to$ این x $\to x = -2 \to 3x-2 = -2 = -8$ (۲)

$\to x = 3 \to 9-2 = 7$ $\Big\}$ $D_f = [-8,7]$

۳- $f\left(\frac{3x+1}{2}\right)$ $D_f = (-1,3) \to x = -1 \to \frac{3x+1}{2} = \frac{-2}{2} = -1$ (۲)

$\to x = 3 \to \frac{3x+1}{2} = \frac{9+1}{2} = 5$

$f(2-5x) \to -1 \le 2-5x \le 5$ $\quad -1 \le x \le 5$ $\quad D_f = \left(\frac{-3}{5}, \frac{3}{5}\right]$

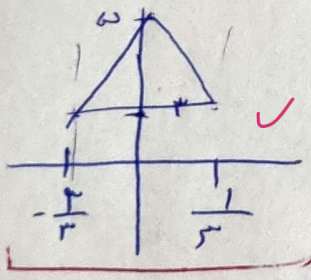
۴- $f(x) =$ 

(۲)

$2f(3x+1)+3 \to -1 \le 3x+1 \le 2$

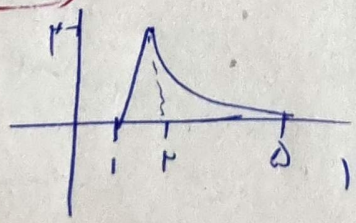
$-\frac{2}{3} \le x \le \frac{1}{3} = D_f$

$R_f = [0,1] \to \times 2 \to +3 \to [0,2] \to [3,5] = R_f$



چون دو سر باز بین

$-\frac{2}{3}$	$\frac{1}{3}$
3	3

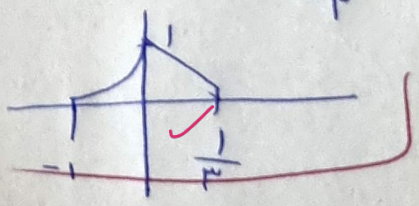
۵- $f(x)$ 

$y = \frac{1}{2} f(2-3x)$ (۲)

$1 \le x \le 5 \to 1 \le 2-3x \le 5$

$-1 \le x \le \frac{1}{3} \to D_f$

$0 \le y \le 2 \to \times \frac{1}{2} \to 0 \le y \le 1 \to R_f$



۶- ~~$y = -\frac{1}{5}|2+2x|$~~

$y = \frac{-1}{3}x^2 + \frac{2}{5}x + 1 \quad ext\Big|_{3}^{4} \rightarrow y = a(x-h)^2 + k = a(x-4)^2 + 3$

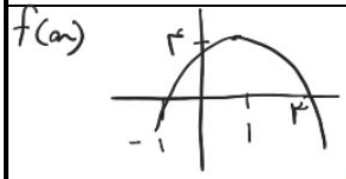
(۲) ضریب x^2 در انتگرال تغییری نمی‌کند $\Leftarrow a = \frac{-1}{3}$

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

یا $x-4 = -3 \rightarrow x = 1$

۶

ریشه‌ها $= \underbrace{x = 7, 1}$



$ext\Big|_{4}^{1} \rightarrow 3x+2 = 1 \rightarrow x = \frac{-1}{3}$

$y = 4 \rightarrow 1 - 2\underbrace{f(3x+2)}_{4} = -7$

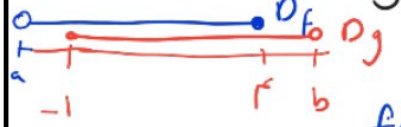
(۲)

$ext\Big|_{\beta}^{\alpha} \rightarrow \alpha = \frac{-1}{3}, \beta = -7$

۷

$\alpha\beta = \frac{-1}{3} \times -7 = \underbrace{\frac{7}{3}}$

$D_f = (a, 4] \quad D_g = [-1, b) \quad y = f(x-1) + g(x+1)$ در $D = (-2, 5)$



(۲)

$g(x) \rightarrow [-1, b)$ در $g(x+1) \rightarrow [-2, b-1)$

$b - 1 = 5 \rightarrow b = 6$

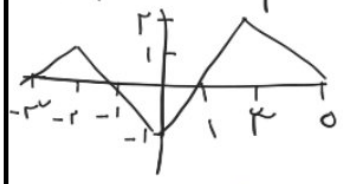
$f(x) \rightarrow (a, 4]$ در $f(x-1) \rightarrow (a+1, 5]$

۸

$a+1 = -2 \rightarrow a = -3$

$a - b = -3 - 6 = \underbrace{-9}$

$y_1 = f\left(\frac{x}{2} + 1\right) \qquad y_2 = \sqrt{|2f(x) - 3|} \qquad -3 \leq x \leq 5$



(۲)

$D_{f(x)} = \left[\frac{-1}{2}, \frac{7}{2}\right]$ ← $x = -3 \rightarrow \frac{-3}{2} + 1 = \frac{-1}{2}$, $x = 5 \rightarrow \frac{5}{2} + 1 = \frac{7}{2}$

۹

$R_{y_1} = [-1, 2] \times 2 \rightarrow [-2, 4] - 3 = [-5, 1]$

$|[-5, 1]| = [0, 5] \rightarrow \sqrt{[0, 5]} = \underbrace{[0, \sqrt{5}] = R_{f(x)}}$

$f(x) = \left|\frac{x+1}{2x+1}\right| \rightarrow g(x) = \left|\frac{x-1}{2x-3}\right| + 1 \quad - \left|\underbrace{\frac{x-1}{2x-3}}_{+}\right| < \underbrace{-1-x}_{+} \rightarrow -1-x > 0$ (۲)

$x < -1$ (۱)

$\frac{x-1}{2x-3} < -1-x \rightarrow \frac{2x^2-4}{2x-3} < 0$

کل به ازای این جواب قدر مطلق + است پس تاثیری ندارد

$2x^2 - 4 > 0 \rightarrow x > \sqrt{2}$ یا $x < -\sqrt{2}$ (۲)

۱۰

به ازای $x < -1$ مخرج − پس صورت +

(۱) ∩ (۲) $= (-\infty, -\sqrt{2})$