۷) (۲)

$(x,y) : (1,4) \to \left(\frac{x-2}{3}, 1-2y\right) : \left(\frac{1-2}{3}, 1-2(4)\right) = (-\frac{1}{3}, -7)$

$\to \alpha\beta = \boxed{\frac{7}{3}}$

۱۸) (۲)

$D_f = (a,4] \to D_{f(x-1)} = (a+1, 5] \xrightarrow{\cap} (-2,5)$

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

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

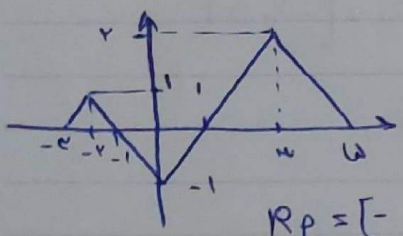
$b-1 = 5 \to b = 6$

$\to a-b = -9$

۱۹) (۲)

$D_{f(x/2+1)} = [-3,5] : 2x-2 = -4 \to x = -1/2$

$2x-2 = 5 \to x = 7/2 \to D_{f'} = [-1/2, 7/2]$



$R_f = [-1, 1] \to R_{2f(x)-4} = [-5, 1] \to R_{|2f(x)-4|} = [0,5]$

دامنه تابع اصلی $f(x)$ و f' بی‌اندازه چون بالای سر x نیومده.

$R_{\sqrt{|2f(x-4)|}} = [0, \sqrt{5}]$

۲۰) (۲)

$f(x) = \left|\frac{x+1}{2x+1}\right| \xrightarrow{①} \left|\frac{(x-2)+1}{2(x-2)+1}\right| \xrightarrow{②} \left|\frac{x-1}{2x-4}\right| + 1 = g(x)$

$x + g(x) < 0 \xrightarrow[x<1]{\text{قدرمطلق}+} x + \frac{x-1}{2x-4} + 1 = \frac{2x^2-4x+x-1+2x-4}{2x-4} = \frac{2x^2-4}{2x-4} < 0$

$-\sqrt{2} \quad \sqrt{2} \quad 4/2$

$- \quad + \quad - \quad +$

$x<1$

$\to (-\infty, -\sqrt{2}) \Big\} \xrightarrow[x>4/2]{\text{قدرمطلق}+}$

$-\sqrt{2} \quad \sqrt{2} \quad 4/2$

$- \quad + \quad - \quad +$

$x>4/2$

$\to$ منفی‌ست، جواب نداره.

$\xrightarrow[1<x<4/2]{\text{قدرمطلق}-} x + \frac{1-x}{2x-4} + 1 = \frac{2x^2-4x+1-x+2x-4}{2x-4} = \frac{2x^2-2x-2}{2x-4} *$

ریشه‌ها: $\frac{2 \pm \sqrt{4-(4\times2\times-2)}}{4} = 1 \pm \sqrt{5}$

$\frac{1-\sqrt{5}}{2} \quad 4/2 \quad \frac{1+\sqrt{5}}{2}$

$- \quad + \quad - \quad +$

$1<x<4/2 \to$ منفی‌ست، جواب‌بندارد

جواب نهایی: $(-\infty, -\sqrt{2})$

۱) (۲)

$(x,y) \to [-2,4] \rightsquigarrow \left(\frac{5x-2}{3}, y\right) \to D_f = [-4, 6]$

۲) (۲)

$\frac{x+2}{3} \to [-2,4] \to x \to \frac{x+2}{3} = -2 \to x = -8$

$\hookrightarrow \frac{x+2}{3} = 3 \to x = 7$

$\to [-8, 7]$

۳) (۲)

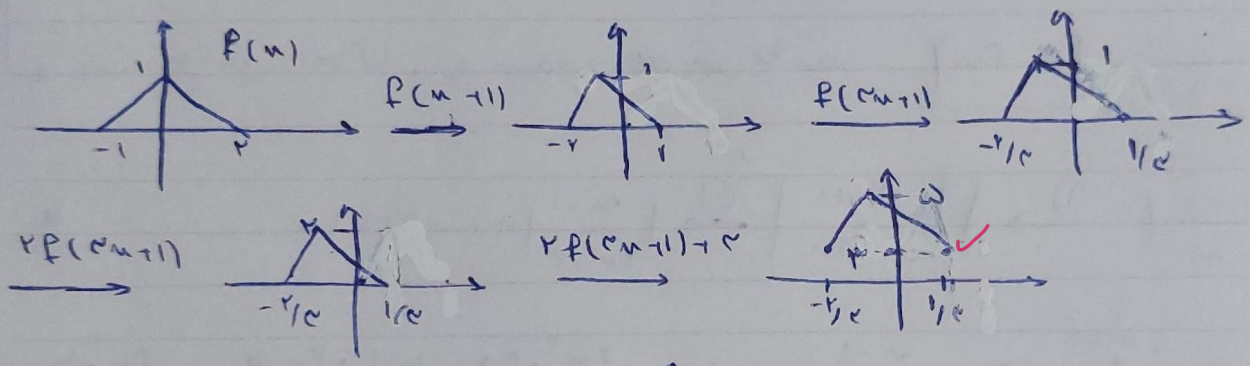
$\frac{2x-1}{3} \to [-1,4) \to \frac{2x-1}{3} = -1 \to x = -1$

$\hookrightarrow \frac{2x-1}{3} = 3 \to x = 5$

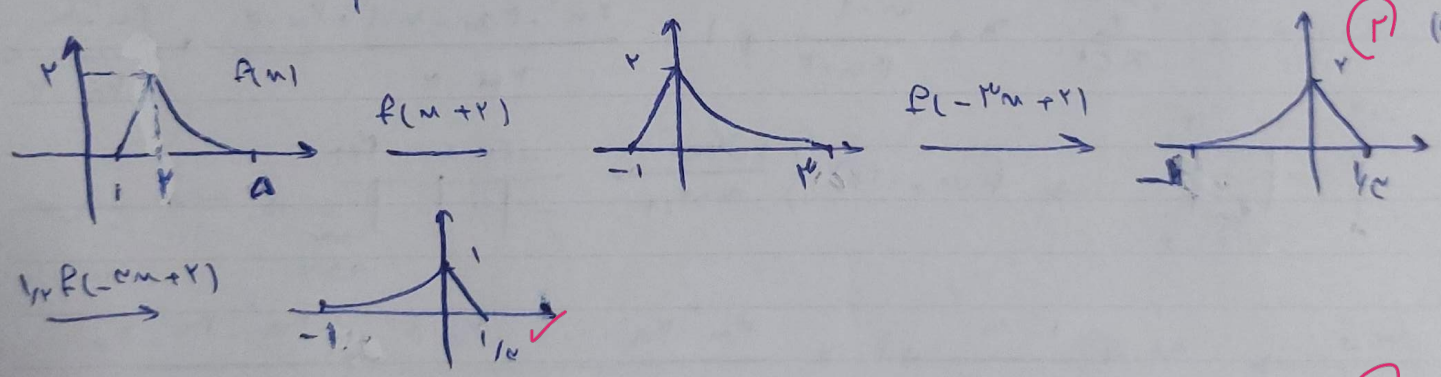
$\to D_f = [-1, 5)$

$-\frac{x}{5} + \frac{2}{5} \to \left(-\frac{3}{5}, 2/5\right]$

۴) (۲)



۵) (۲)



۶) (۲)

راس $f(x) = \frac{-b}{2a} = \frac{-2/5}{-2/5} = \frac{3}{5} \to y = \frac{28}{25}$

$\Rightarrow f(x) = a(x - 3/5)^2 + \frac{28}{5} \to a = -1/5 \to f(x) = -1/5(x - 3/5)^2 + \frac{28}{5}$

$f(x') = -1/5(x-4)^2 + 5 \to y = f(x') = -1/5(x-4)^2 + 5 = 0 - 3$

$(x-4)^2 = 9 \to x = 1$

$\hookrightarrow x = 7$