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$$y = -\frac{1}{3}x^3 + \frac{5}{2}x^2 + x + 1 = -\frac{1}{3}\left(x^3 - \frac{15}{2}x^2 - 3x\right) + 1$$

$$= -\frac{1}{3}\left(x - \frac{3}{2}\right)^3 + \frac{25}{4}x + \frac{9}{4}$$

$$\Rightarrow y = -\frac{1}{3}\left(x - \frac{3}{2}\right)^3 - \frac{37}{4}\left(x - \frac{3}{2}\right) + \frac{37}{8}$$

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$$-\frac{1}{3}\left(x - \frac{3}{2}\right)^3 - \frac{37}{4}\left(x - \frac{3}{2}\right) + \frac{37}{8} = -\frac{1}{3}\left(x - \frac{3}{2}\right)^3 + \frac{37}{4}x + \frac{37}{8}$$

$$-\frac{1}{3}\left(x - \frac{3}{2}\right)^3 + \frac{37}{4}x + \frac{37}{8} = 0$$

$$\left(x - \frac{3}{2}\right)^3 - 37x - \frac{37}{2} = 0$$

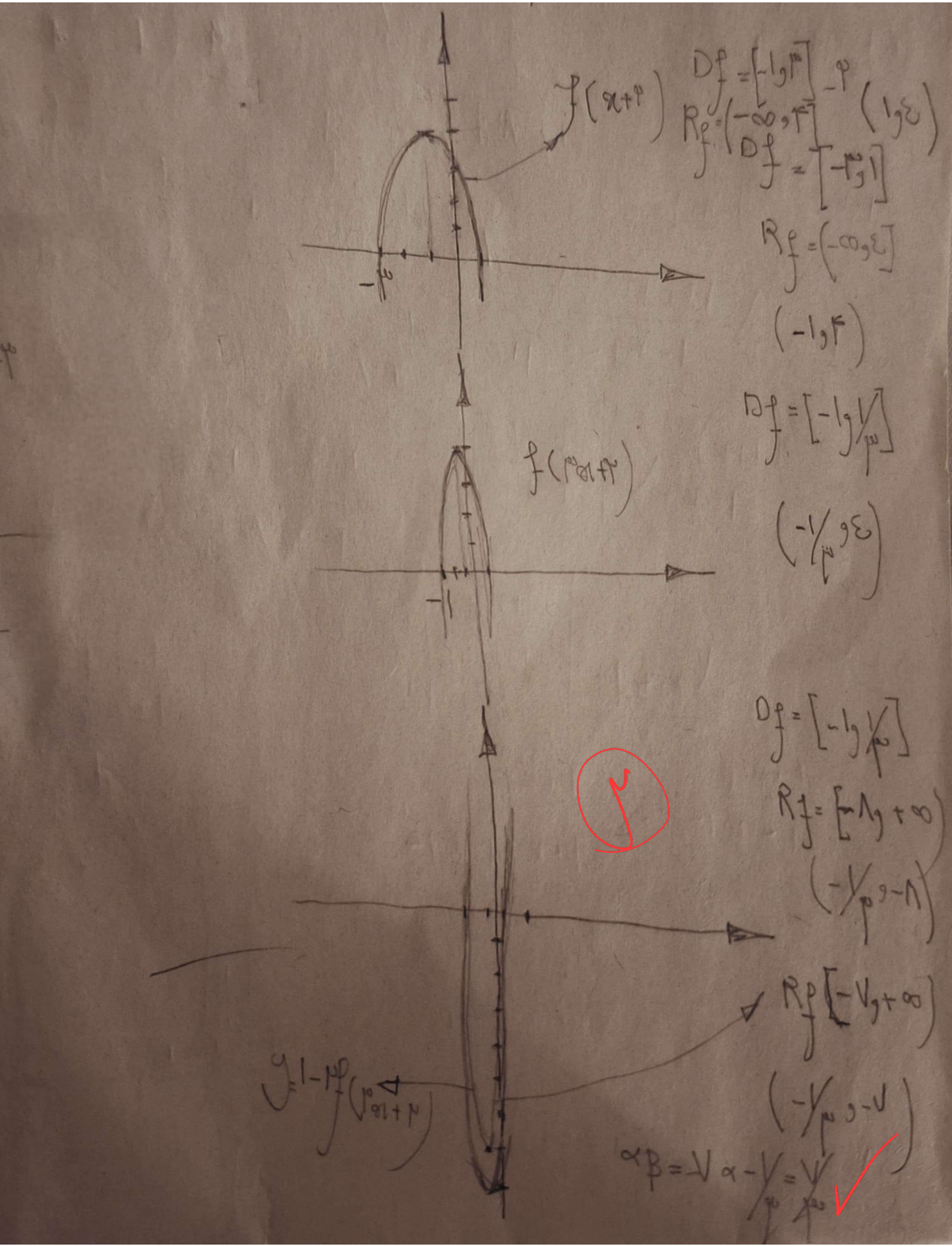
$$x - \frac{3}{2} = -4 \Rightarrow x = -\frac{5}{2}$$

$$x - \frac{3}{2} = 4 \Rightarrow x = \frac{11}{2}$$

$$x - \frac{3}{2} = 0 \Rightarrow x = \frac{3}{2}$$

$$x - 4 = 4 \rightarrow x = 8$$

$$x - 4 = -4 \rightarrow x = 0$$


f(x+2)
Df = [-1, 3]
Rf = (-∞, 4]
f(3x+2)
Df = [-1, 1/3]
Rf = (-∞, 3]
Df = [-1, 1/2]
Rf = [-1, +∞)
Rf [-1, +∞)
y = 1 - 2f(3x+2)
αβ = -1 α - 1/2 = 1/2

$$\sqrt{2x} \longrightarrow \sqrt{2x+1}$$

$$\longrightarrow -2 + \sqrt{2x+1} \longrightarrow 2 + \sqrt{2x+1}$$

$$\frac{8}{4} = 2 + \sqrt{2x+1} \qquad \frac{4}{2} = \sqrt{2x+1}$$

$$\Rightarrow \frac{4}{4} = 2x+1 \Rightarrow \frac{2}{4} = 2x \longrightarrow 2x = \frac{1}{4}$$

$$\Rightarrow x = \frac{2}{8}$$

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

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$D_f = (a, f] \rightarrow D_{f(x-1)} = (a+1, \dots]$

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

$a+1 = -2 \Rightarrow a = -3$ ✓

$b-1 = 0 \Rightarrow b = 1$ ✓

$\Rightarrow -3-1 = -4 = a-b$ ✓

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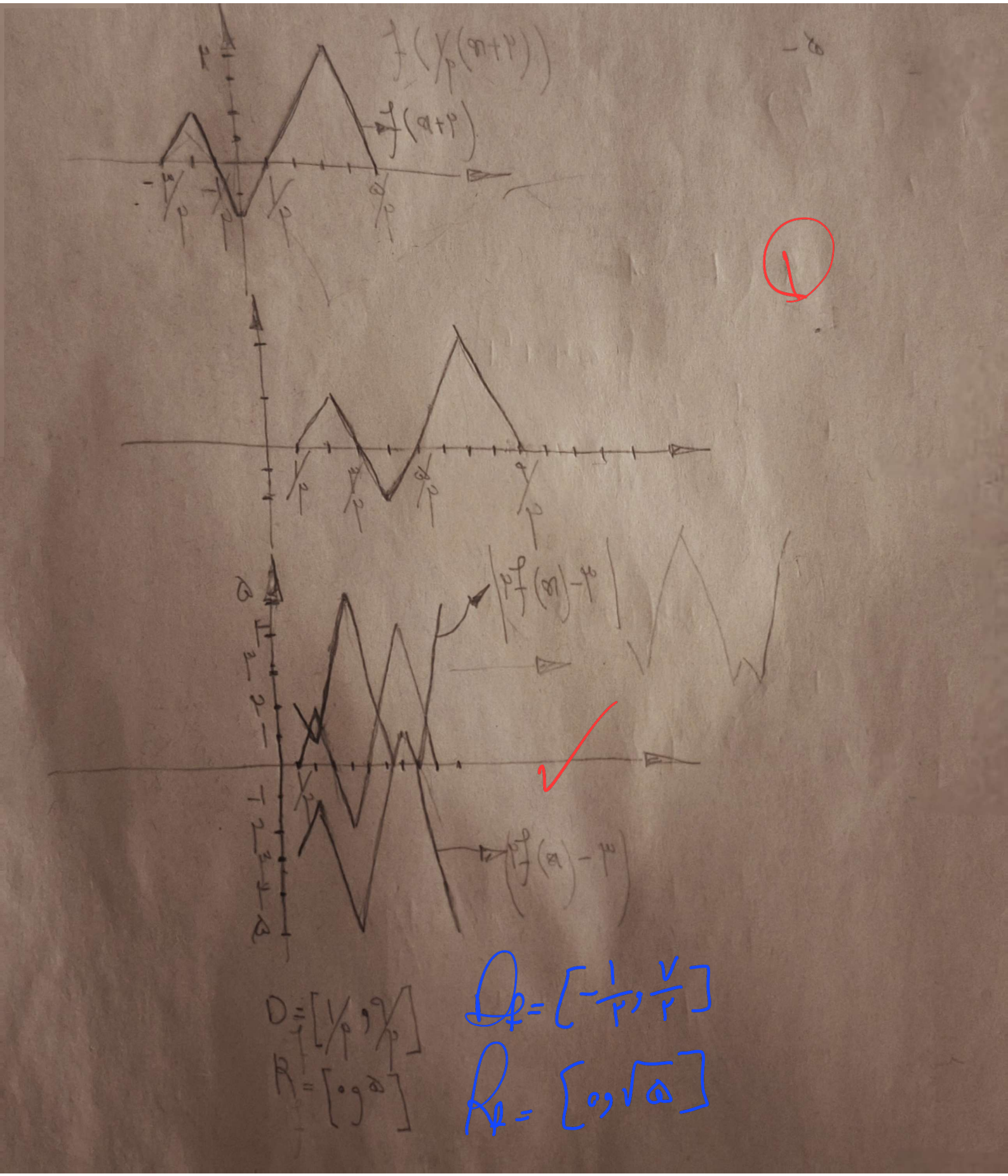
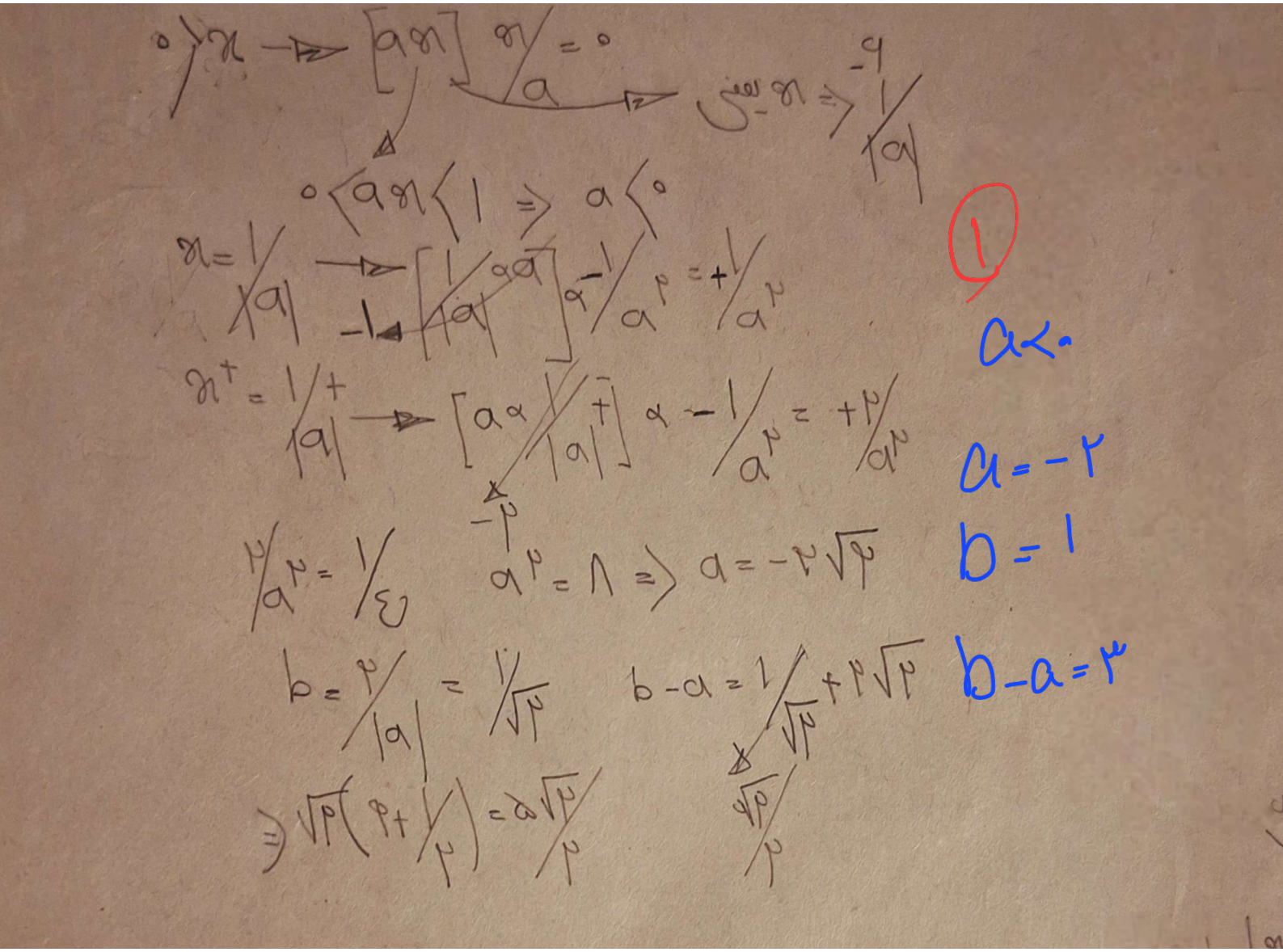


$D = [-\frac{1}{2}, \frac{5}{2}]$

$R = [0, 3]$

$D_f = [-\frac{1}{2}, \frac{5}{2}]$

$R_f = [0, \sqrt{3}]$


a < 0
a = -2
b = 1
b - a = 3

$f(x) = \log_{\mu} x$

$\log_{\mu}^{x+\mu} \leftarrow -\log_{\mu}^{x+\mu} \leftarrow -\log_{\mu}^{x+\mu} \leftarrow -\log_{\mu}^{x+\mu} \leftarrow -\log_{\mu}^{x+\mu} = g(x)$

$g(-1) + g(-4) = 3 - 4 + 3 - 9 = -7$

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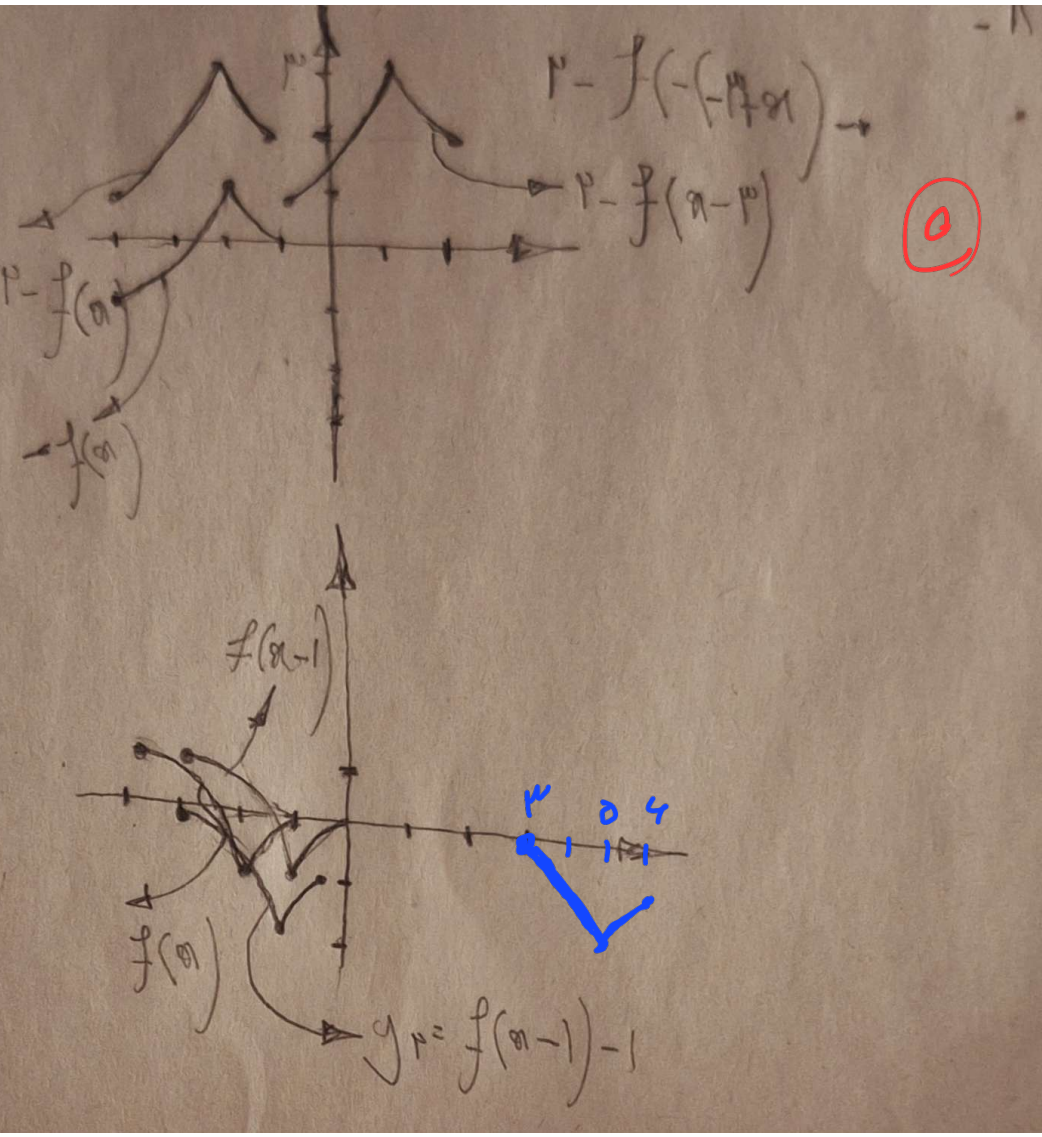
$D_{y_1} = [2, 5]$

$D_{y_2} = [3, 6]$

$R_{y_1} = [-1, 1]$

$R_{y_2} = [-2, 0]$



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$$f(x)=\left|\frac{x+1}{1+x^2}\right| \longrightarrow \left|\frac{x+1}{1+x^2}-1\right|$$

$$=\left|\frac{x+1}{1+x^2}+\frac{-x^2-x+1}{1+x^2}\right|=\left|\frac{-x^2-x}{1+x^2}\right| \longrightarrow$$

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

(1)

$$x+1+\left|\frac{-x^2-x}{1+x^2}\right|<0 \Rightarrow 1+x+\left|\frac{-x^2-x}{1+x^2}\right|<-x-1$$

$$\left|\frac{-x^2-x}{1+x^2}\right|<-2x-2 \Rightarrow \frac{x^2+x}{1+x^2}<-2x-2$$

$$\frac{x^2+x+2x+2+2x^3+2x}{1+x^2}<0 \Rightarrow \frac{2x^3+x^2+5x+2}{1+x^2}<0$$

$$2x^3+x^2+5x+2<0$$

$$(x+\tfrac{1}{2})(2x^2+5)<0$$

x	$-\infty$		$-\frac{1}{2}$		$+\infty$
$x+\frac{1}{2}$	$-$	$-$	0	$+$	$+$
$2x^2+5$	$+$	$+$	$+$	$+$	$+$
$(x+\frac{1}{2})(2x^2+5)$	$-$	$-$	0	$+$	$+$

$$x<-\frac{1}{2}$$

$$\left|\frac{-x^2-x}{1+x^2}\right|<-2x-2 \Rightarrow \frac{x^2+x}{1+x^2}<-2x-2$$

$$\frac{x^2+x+2x+2+2x^3+2x}{1+x^2}<0 \Rightarrow \frac{2x^3+x^2+5x+2}{1+x^2}<0$$

$$2x^3+x^2+5x+2<0$$

$$(x+\tfrac{1}{2})(2x^2+5)<0$$

x	$-\infty$		$-\frac{1}{2}$		$+\infty$
$x+\frac{1}{2}$	$-$	$-$	0	$+$	$+$
$2x^2+5$	$+$	$+$	$+$	$+$	$+$
$(x+\frac{1}{2})(2x^2+5)$	$-$	$-$	0	$+$	$+$

$$x<-\frac{1}{2}$$

$$\frac{2(x-\sqrt{2})(x+\sqrt{2})}{2x-4}<0$$

$$(-\infty,-\sqrt{2}]$$

$$\frac{-x^2-x}{1+x^2}<-2x-2 \Rightarrow \frac{x^2+x}{1+x^2}<-2x-2$$

$$\frac{x^2+x+2x+2+2x^3+2x}{1+x^2}<0 \Rightarrow \frac{2x^3+x^2+5x+2}{1+x^2}<0$$

$$2x^3+x^2+5x+2<0$$

$$(x+\tfrac{1}{2})(2x^2+5)<0$$

x	$-\infty$		$-\frac{1}{2}$		$+\infty$
$x+\frac{1}{2}$	$-$	$-$	0	$+$	$+$
$2x^2+5$	$+$	$+$	$+$	$+$	$+$
$(x+\frac{1}{2})(2x^2+5)$	$-$	$-$	0	$+$	$+$

$$x<-\frac{1}{2}$$

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$y' = (x-2)^3 + 27 \rightarrow \frac{27}{8}(x-2)^3 + 27 = 0$

$g(x) = \sqrt{f(x)(18 - f(x))}$

$x = -1$, $x = 3$

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

$D_f = [0, \frac{8}{3}]$

$D_g = [-1, 3] \rightarrow -1 \leq x \leq 3$

۳ عدد صحیح